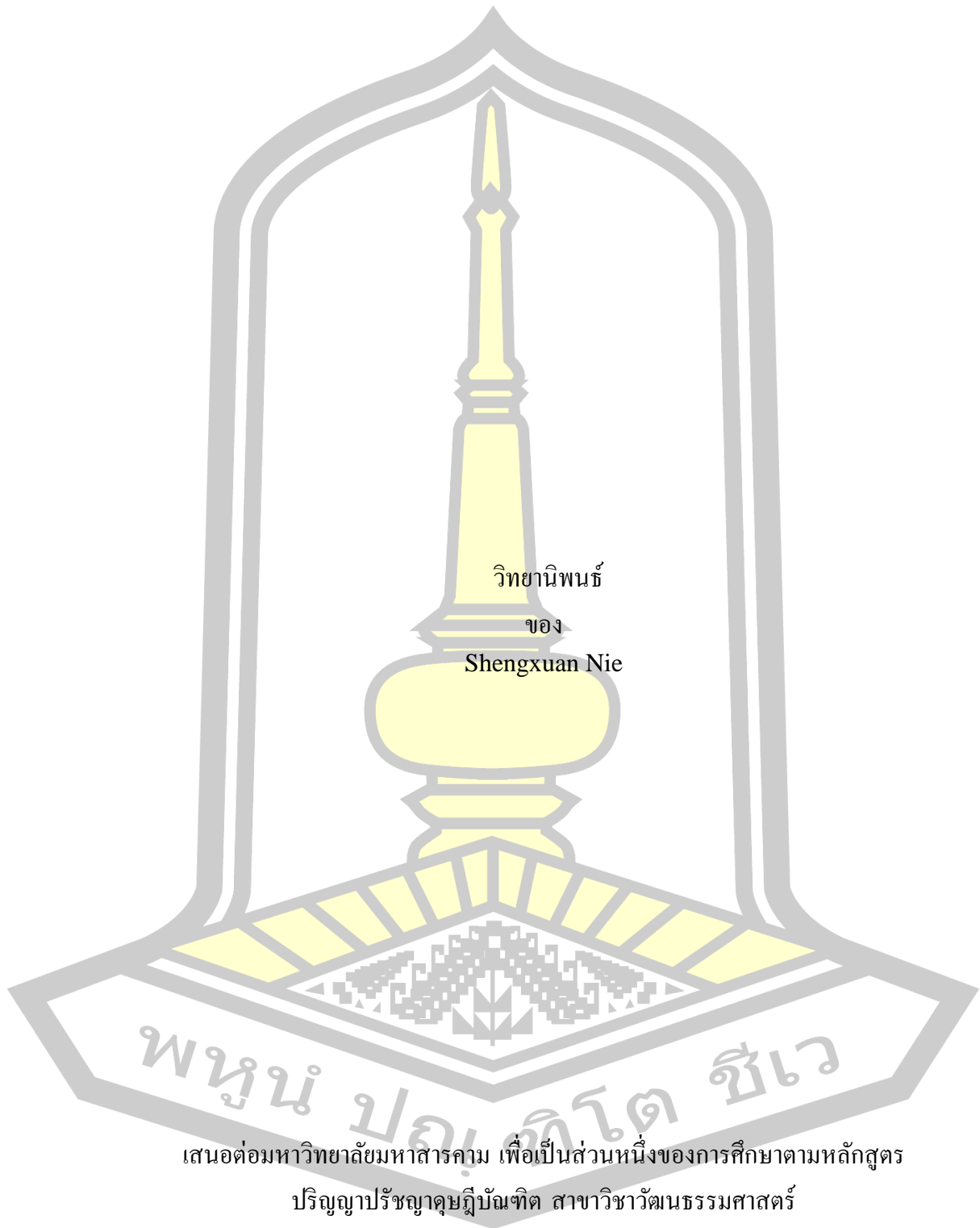Touch Designer: An applied model in Contemporarychinese visual art

Shengxuan Nie

A Thesis Submitted in Partial Fulfillment of Requirements for
degree of Doctor of Philosophy in Cultural Science
November 2023

นักออกแบบระบบสัมผัส: โมเดลประยุกต์ในทัศนศิลป์จีนร่วมสมัย

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ของ
Shengxuan Nie

Touch Designer: An applied model in Contemporarychinese visual art
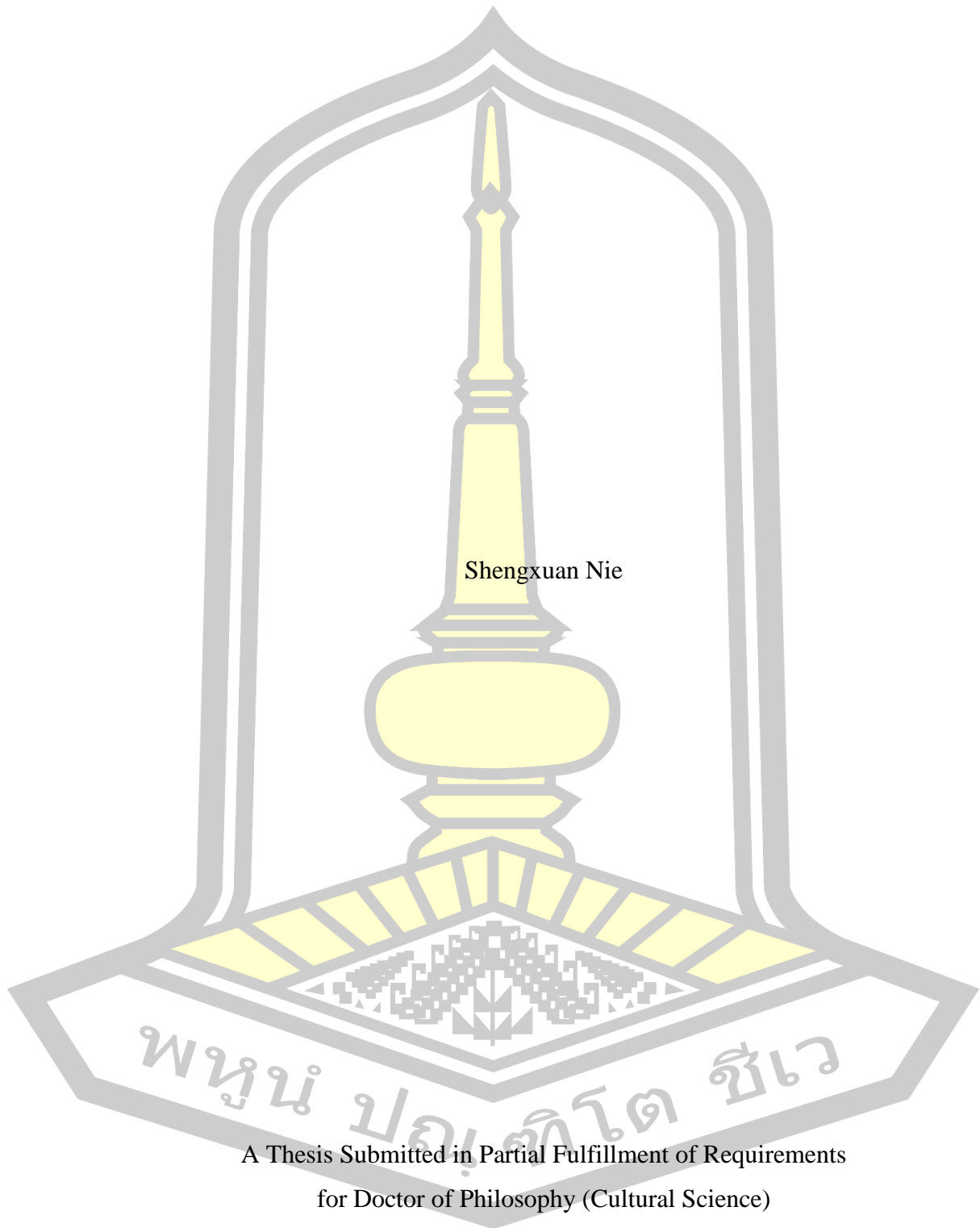
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A Thesis Submitted in Partial Fulfillment of Requirements

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The examining committee has unanimously approved this Thesis, submitted by Mr. Shengxuan Nie , as a partial fulfillment of the requirements for the Doctor of Philosophy Cultural Science at Mahasarakham University

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TITLE	Touch Designer: An applied model in Contemporarychinese visual art
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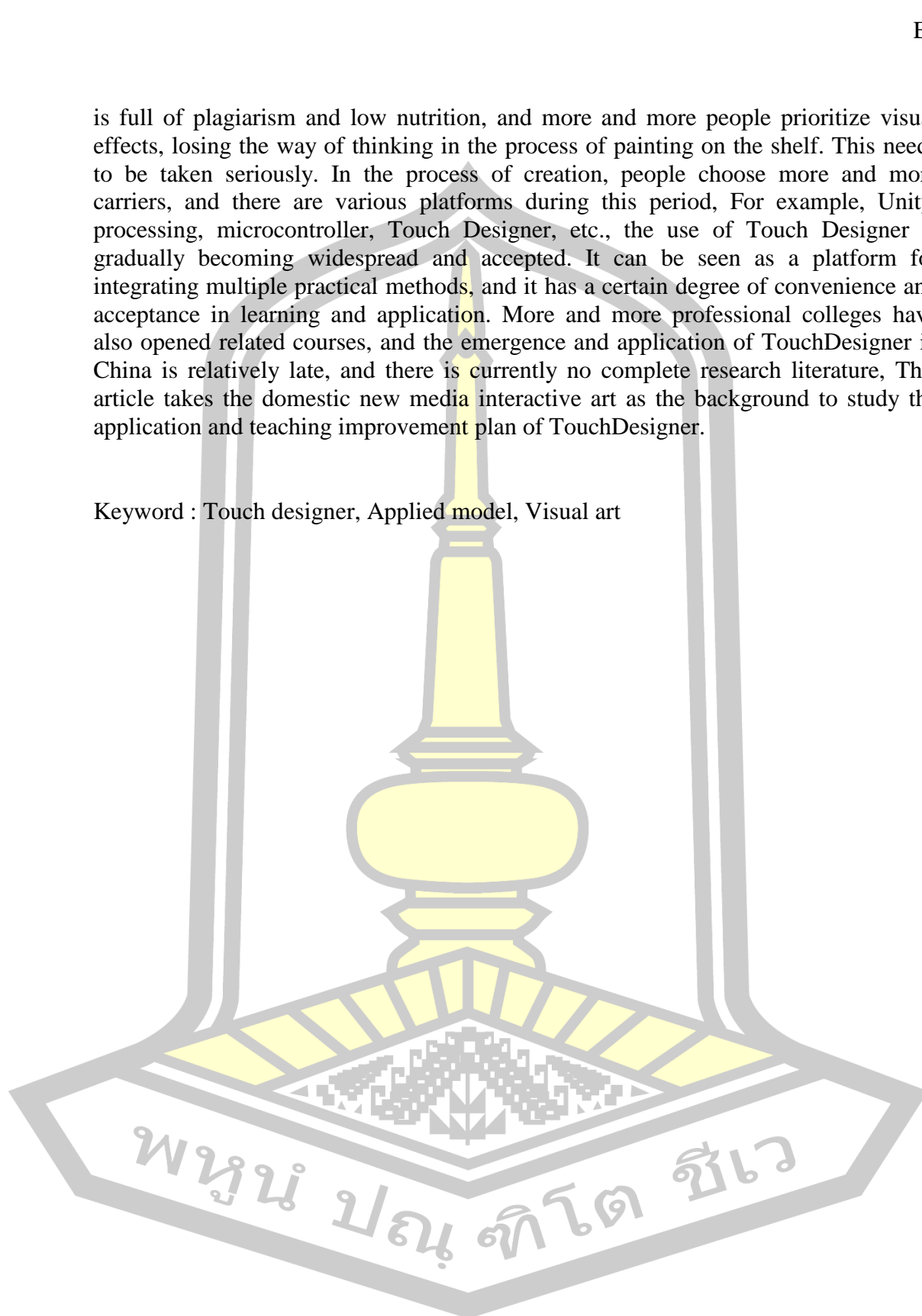| **DEGREE**	Doctor of Philosophy	**MAJOR**	Cultural Science
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ABSTRACT

At present, we are in a period of gradual progress from the "information age" to the "intelligent age". Digital technology is advancing rapidly, and the popularization of the Internet and mobile networks has completely changed people's work and lifestyle. The development of artificial intelligence technology is once again impacting people's production and life. It can be said that we are in an era of dramatic changes in both Material culture and ideology. At the same time, with the shift from modern art to modernism, art has become more diverse and decentralized, increasingly related to people's daily lives. For Video art, the involvement of digital technology and even artificial intelligence technology has brought unprecedented opportunities for its creation and dissemination, which not only makes the creation language, expression form and existence mode of image more rich and varied, but also makes its dissemination more extensive and fast.The inherent characteristic of new media image interaction art is its diverse characteristics. From the diversification of expression methods to the diversification of interaction methods. The creators endow the works with rich connotations based on different perspectives such as culture, history, nature, philosophy, etc., which leads to different interpretations of the works by the audience, resulting in many uncontrollable factors. It is precisely this uncontrollable factor that makes the experience of interactive device works flexible and changeable. At the same time, this art form also has the characteristic of gameplay. The entertainment model serves as a bridge connecting the creator's expression of emotions to the audience's integration into the work to gain insights. More importantly, interactive imaging, as a way of expression and creative medium in the information age, has penetrated into all aspects of work and life, and is the most closely connected and popular new media art form with people's daily lives. Now our life is full of interactive video or digital Video art works everywhere, such as virtual world vr, online exhibition, online shopping, online games, various exhibitions in real space, and public space, we can see their colorful figures. Even traditional paper media, movies, and television have evolved into carriers of digital imaging and interactive art. There is no doubt that we have entered an era of "interactive image", "image reading", "digital simulacrum" and the generalization of digital Video art.

However, during this period, with the recovery of the economy and the development of the internet, media interactive art has also demonstrated the style of "fast food" works and thinking. Under technological bottlenecks, media interactive art

is full of plagiarism and low nutrition, and more and more people prioritize visual effects, losing the way of thinking in the process of painting on the shelf. This needs to be taken seriously. In the process of creation, people choose more and more carriers, and there are various platforms during this period, For example, Unity, processing, microcontroller, Touch Designer, etc., the use of Touch Designer is gradually becoming widespread and accepted. It can be seen as a platform for integrating multiple practical methods, and it has a certain degree of convenience and acceptance in learning and application. More and more professional colleges have also opened related courses, and the emergence and application of TouchDesigner in China is relatively late, and there is currently no complete research literature, This article takes the domestic new media interactive art as the background to study the application and teaching improvement plan of TouchDesigner.

Keyword : Touch designer, Applied model, Visual art

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assistance provided by the research achievements of various scholars, it would be difficult for me to successfully complete this master's thesis. Sincere thanks to every scholar!

In short, during these three years of doctoral studies, I not only honed my academic research abilities, but also enriched my life experience. On the occasion of my graduation from graduate school, I would like to express my sincerest gratitude to the teachers, classmates, and friends who accompanied me through my three years of graduate studies!

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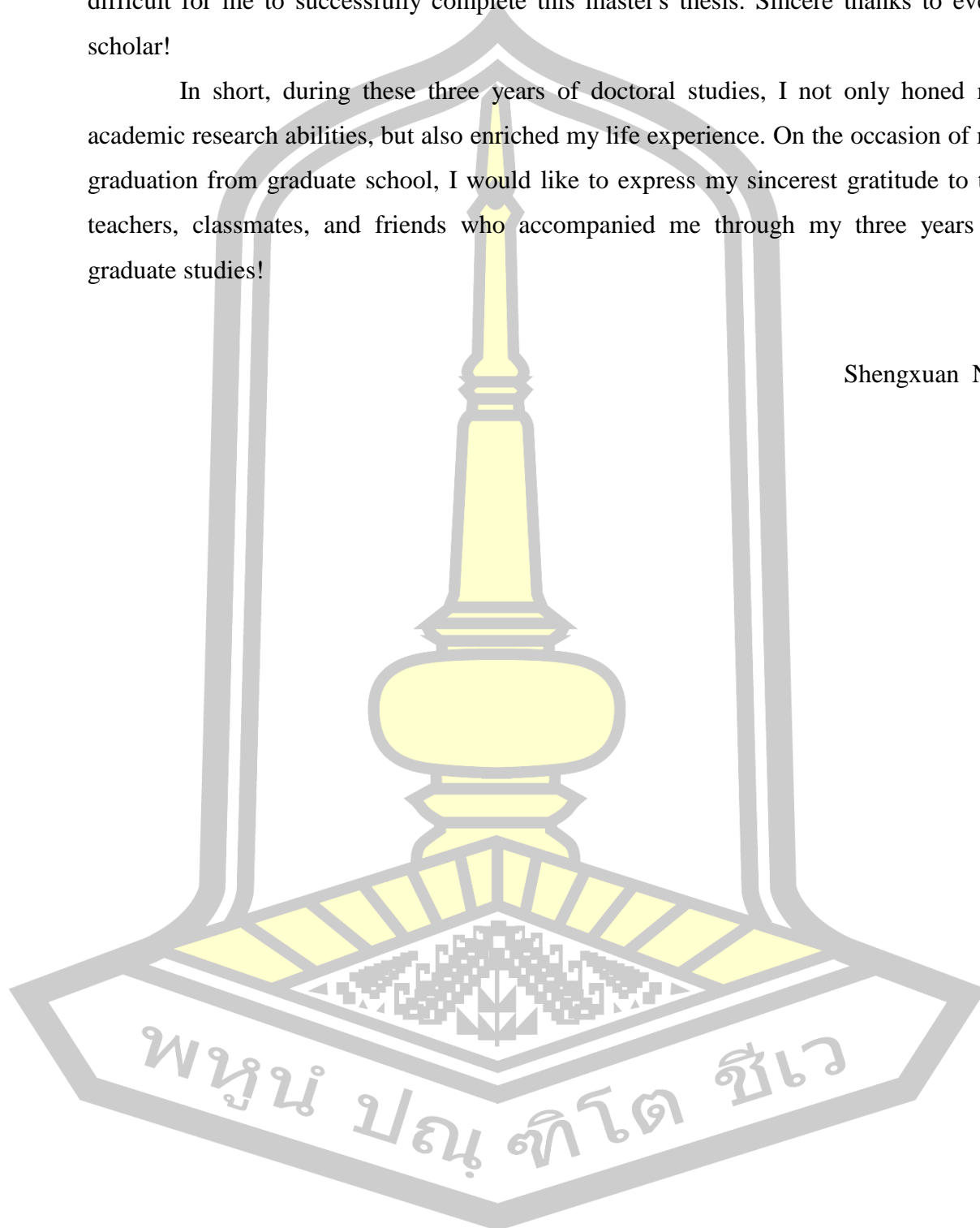
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CHAPTER I

INTRODUCTION

1.1 Research Background

Whether in the East or the West, art has always had an important value and role for humanity. In the vast art system, visual art has always been the main way of artistic activity and creation. From rock painting to easel painting, and now to media art, this transformation of visual methods has also brought multiple changes to people, society, and life. In China, the development of media art directly affects social activities and the transformation of social concepts.

The term 'new media art' first appeared in the 1960s, specifically referring to television installation art represented by Bai Nanzhun. It can be understood as' new media art 'to distinguish it from media art previously represented by Andy Warhol. To this day, new media art has covered all fields of art, covering all categories of art, and has also given birth to layers of evolution from the inside out. As far as this article is concerned, the so-called new media art refers to the art that has been born through new media. The term 'new media' here refers to digital information storage and dissemination media based on multimedia computers, the Internet, satellite communication, and interactive simulation technology, while 'new media art' refers to the use of these new media technologies as support to comprehensively innovate in artistic behavior such as creation, carrying, dissemination, acceptance, and criticism, and thus to enhance the aesthetic perception of art A new form of art that undergoes profound changes in experience and thinking. In 1963, Korean American artist Pak Nam jung held an exhibition called "Music Expo - Electronic Television" in Kassel, Germany, marking the beginning of video installation art. The artist used television, a new emerging media at that time, to explore the occasional effects of electronic images, laying the foundation for the artist's position as the "father of video art" and "father of new media art". In November 1988, the "pioneering work" of Chinese video art, "30 × 30 "was completed by artist Zhang Peili and screened at the" 88 China Modern Art Creation Seminar ". On September 14, 1996, the "Phenomenon Video"

video art group exhibition was held at the China Academy of Fine Arts in Hangzhou. This was the first thematic art exhibition in China to focus on video installations.

In 1945, Maya Durin's experimental short film "A Study of choreography for the camera" became the initial textbook for dance image creation, and with her unique creative philosophy, the value of dance images exceeded the function of recording dance and became a form of creative behavior and means. In 2002, the Beijing Dance Academy established the Department of Art Communication and the Television Dance major, followed by the establishment of the Television Dance Laboratory and Master Workshop. In 2006, graduates of this major, such as Kang Jianfei and Gu Jinghui, wrote "Chasing Dreams", which was one of the earliest dance short films shot in China, vividly telling the story of the protagonist traveling through time and space to Beijing to attend the Olympic Games. In 1977, George Lucas directed Star Wars, which extensively utilized film special effects; In 1993, the movie "Jurassic Park" began to use digital technology to shape characters that do not exist in real life; In 1995, the release of the 3D digital animated film "Toy Story" confirmed the possibility of fully digital production of animated films. At the turn of the century, digital cinemas around the world were established one after another; The birth of "Planet 2: The Attack of the Clones" in 2002 marked the complete digitization of the film industry chain. In China, the domestically produced film "Battle of Nanjing, Shanghai, and Hangzhou" released in 1999 utilized digital synthesis methods, taking the step of digitizing Chinese films; The 2000 release of 'Emergency Landing' began to heavily utilize computer stunts for production; The same year's release of "Liao Zhai Xi Fangping" also attempted the production of virtual fireworks, using digital technology to enhance the classical cultural atmosphere; Afterwards, with the official screening of digital films in domestic digital cinemas, China officially entered the era of digital cinema.

In summary, these artistic phenomena that have appeared both domestically and internationally share a common name: new media art. The extension of this new media art concept covers all artistic phenomena generated by new media technology, so it is not limited to visual art, but involves all art categories. Its main forms include new media language art such as online literature, visual arts such as video art, computer painting, various computer animations, interactive environment art,

installation art, new media dance and performance art such as video dance, online choreography, multimedia stage play, digital movies, digital TV art programs, various DV short films, and new media music art (electronic music).Chinese new media art began in the late 1980s and entered the international stage after going abroad in the 1990s. Since its entry into China, new media art has gradually freed itself from the constraints and influence of Western new media art and gone through a process from deconstruction to construction. The shaping mechanism of art has gone through a cycle of multiple media to single media, and then from single media to multiple media. With the maturity of human spirit and technological progress, the shaping mechanism of art has also shifted from multi media to single media. After differentiation and independence, various art categories have media characteristics that focus on a single sensory object for dissemination. Different arts bring different aesthetic feelings to people, and each media modeling mechanism and materialization method is becoming increasingly refined and perfect. New media artists explore and advance from practical methods to practical applications, from static images to dynamic vision, from single interaction to the combination of sound and light, and the form of artistic expression constantly iterates and changes.

TouchDesigner digital new media art is a manifestation of the digital age, and from daily work to life, TouchDesigner digital technology has gradually become the foundation. Artists, critics, and collectors in the field of art have several attitudes towards TouchDesigner's digital new media art: firstly, they adopt a favorable attitude towards TouchDesigner's digital new media art, and are more inclined towards emerging art. They believe that the core of TouchDesigner's digital new media art is greatly influenced by technology, and will produce more diverse and innovative works in today's technological development. The second is to attach great importance to digital new media art, believing that it transcends the limitations of traditional art materials and forms of expression in the past, and pursues larger, newer, and more cutting-edge technologies in creation; The third is a neutral wait-and-see attitude, where they are willing to accept emerging things and also willing to change due to the existence of new things.

The new form of TouchDesigner cannot be replaced by traditional art. One is its technological dependence: the development of digital new media art cannot be

separated from the innovation of digital technology. From the perspective of new media art works in the past decade, the vitality of digital new media cannot be separated from the nourishment of social and technological development. From the works that have been accepted by the public and various exhibitions, a thread can be organized: works of art that have a significant impact, possess scientific knowledge, complex structures, massive calculations, and updates in computer systems and algorithms that other similar works do not possess. Secondly, TouchDesigner digital new media art has interactivity, and TouchDesigner digital media works place more emphasis on user experience, increasing user and system autonomy and freedom. In some digital new media art works, viewers no longer need to operate complex systems and type commands. The work has become an independent system that only requires the audience to enter, and the system generates different feedback based on various situations. The work itself has a strong interactivity, with users interacting with it and providing a realistic experience. Thirdly, TouchDesigner digital new media art has diverse expressiveness. TouchDesigner digital technology provides new media art with more advanced technological means, more types of materials, and easier media platforms for disseminating information, among other channels to different paths. It also empowers new media artists to create more unknown possibilities. The appearance of new media art works will only become increasingly international and diverse. Fourthly, TouchDesigner digital new media art has extensibility. TouchDesigner artists can acquire equal knowledge and technical resources (requiring their own efforts), and through research, analysis, summarization, and refinement, combined with their own ideas, create many works that share the same essential technology and algorithm, but have different presentation effects. At the same time as these works appeared, they influenced a larger number of artists to have deeper and broader thinking.

Since the support of digital technology, the digital media art of TouchDesigner has expanded infinitely in its diverse forms of expression. This versatile feature has led to the commercial success of TouchDesigner's digital new media art at exhibitions. However, the successful digital new media art of TouchDesigner in the market that we can see in daily life is still very few, and it still faces several difficulties. Firstly, the revitalization of TouchDesigner's digital new media art is

based on the development of digital technology, which, as a discipline of knowledge, naturally requires sharing, dissemination, and inheritance of education. Many schools and educational institutions both domestically and internationally have gradually incorporated new media art as a discipline, and some have established specialized departments or even colleges. However, there are still some schools and institutions that are not yet completed, and they are good at building TouchDesigner's digital new media art. The fundamental reason why it is difficult to develop in schools and institutions is that digital new media art, as an art form that requires digital technology support, students majoring in art or design do not have the time and resources to devote themselves to research and learning digital technology. Moreover, many art colleges have faculty that cannot fully involve non professional fields. Secondly, in the creation of digital new media art, most of the current art works are still at a low level in the professional field, and can be completed through one's own learning or professional guidance and assistance. Creating such "low tech" art works, even if the technical means are not very advanced and the materials are not particularly expensive, still requires a significant amount of financial reserves.

In terms of the survival status of most digital new media artists, the cost issues of material testing and equipment debugging and maintenance need to be addressed. In addition, the current digital new media art works are almost saturated in exhibitions, and there are few examples of being collected and purchased. Finally, there are plagiarism and copyright issues in TouchDesigner's digital new media art. The production of TouchDesigner's works has a single directionality, as it is a visual programming software with a single directionality from process to result. People can easily plagiarize and copy previous content through case studies, resulting in many works with similar styles, The same problems arise in both social applications and school teaching.

On this basis, the research direction of this article is applied research, providing solutions and references for these emerging problems through application models. By studying the history of TouchDesigner and the development of digital media art in China, studying the current application status and problems of TouchDesigner in China, and designing a set of methods for using TouchDesigner in contemporary art creation.

1.2 Research objective

1.2.1 Study the history of TouchDesigner and the development of digital media art in China.

1.2.2 Study the current application status and problems of TouchDesigner in China.

1.2.3 The creative method of TouchDesigner in contemporary art creation.

1.3 Research questions

1.3.1 Taking TouchDesigner as the research object, what stages have digital media art gone through in China.

1.3.2 In the application of TouchDesigner in China, what is the state of school teaching and how to solve the problems encountered.

1.3.3 How to make TouchDesigner's creativity comprehensive and sustainable in the design of application models.

1.4 The importance of research

1.4.1 By studying the emerging phenomenon of digital language culture, we can help us expand on another possibility of media art today。

1.4.2 By studying the impact and changes of TD on Chinese video art, it helps us find our own suitable position in the development of art and emerging cultural industries.

1.4.3 Through the study of TouchDesigner digital language and its extended research, it is conducive to excavating its direct value and historical value in Chinese society and people.

1.4.4 Touch Designer can be used as a technical means to conduct research, study its use of techniques and methods. It can use TouchDesigner for artistic creation formed a style culture as a research object, since the introduction of TouchDesigner to China, artists and technicians will play a technical means to use, since 2017 in the university student body more and more people began to use TouchDesigner, this peak from 2020, has continued to the present, more and more schools also open related courses as auxiliary research and learning. The emergence of TouchDesigner should emerge as a new force in the history of Chinese video, which has influenced the

creation and artistic presentation of media art at present. The technology and culture involved in the study of TouchDesigner is conducive to the development and combing of Chinese media art, if there is no research, after this time node, this technology will be popularized or replaced by other technologies, the current media art, the collision, integration, development of new technologies on traditional art, it is worth in-depth study.

1.5 Definition of terms

1.5.1 TouchDesigner: TouchDesigner is a node based programming software developed by a Canadian company. It can create different visual effects through node based programming, and can also serve as an integrated platform for interactive visual creation. Since its development, there have been three versions, namely version 077088099. The research object in this article is version 099, which is the latest version. In terms of software production content, The research in this article covers TouchDesigner's creation of graphic visual works, digital imaging works, lighting art works, and projection art works. In the paper, Touch Designer includes 1 advertising and commercial projection based on Touch Designer, and 2 digital media art works created using Touch Designer as a tool, including images, videos, and projections. 3. Practical cases of using Touch Designer for creative teaching. The audience for Touch Designer is students from the Academy of Fine Arts, new media artists, and advertising merchants.

1.5.2 Applied model: The concept of Applied Model is very broad, which includes application aspects from different disciplines and fields, as well as different forms. People use different application models to study and solve different problems. The application model in this article is applicable to users of TouchDesigner and students majoring in digital media at the Academy of Fine Arts. The application aspect is artistic creation in the field of art, In terms of teaching for digital media majors in the field of art, the three types of models are practical guidance methods, and the author will create an icon for reference.

1.5.3 visual art: Visual art refers to the use of certain materials, techniques, and techniques to create works of art that can be viewed and appreciated by people. In a broad sense, sculpture, painting, photography, and other art categories belong to its

category. The visual art mentioned in this article only includes the art of using digital media for creation, and the forms of creation include videos, images, projections, and lighting, The scope of visual art is local digital media art in China since 1990.

        1.5.4 Contemporary China: Contemporary China, contemporary China, is China in the process of reform and opening up. There is no end to China's reopening.So many predictions about China are meaningless because China is constantly changing. The contemporary era referred to in this article refers to China from 1990 to 2023, including 1 contemporary digital media art works in China, 2 contemporary digital media artists and students in China, and 3 applications of digital media technology in contemporary China. In the application of digital media art in research models, it refers to China in 2023, which is the current time. This study is helpful for the application of digital media art in the current era. the application of digital media art in the present.

1.6 Conceptual Framework

Theoretical Foundation and Literature of Digital Imaging in China

population structure Touch Designer users: students, teachers, media practitioners, businessmen, professional artists, vi practitioners, musicians, with regional distribution in Beijing, Shanghai, and Guangzhou.

Research objectives
1 study the history and development of the touchdesigner in China
2. Research and analyze the impact of Touch Designer on Chinese media art after its introduction to China.
3. Research the current situation and problems of the application of Touch Designer visual language culture in China.Design a Touch Designer course teaching solution.

research method
1 Literature analysis methods
2 Comparison method
3 Case analysis methods
4. Inductive Reasoning Methods

Research induction
1 Interpretation of Touch Designer by a group of individuals
2 Application Cases of Touch Designer for Art Team
3 Innovation in Theory and Teaching Practice

research tool
1 Reference generation tool
2 Literature management tools
3 Literature retrieval tools
4 Course Practice Equipment and Tools

Date Collection
Date Analysis

Research Conclusion

Touch Designer: Application Model in Contemporary Visual Art Design Teaching in China

Table 1 Conceptual framework
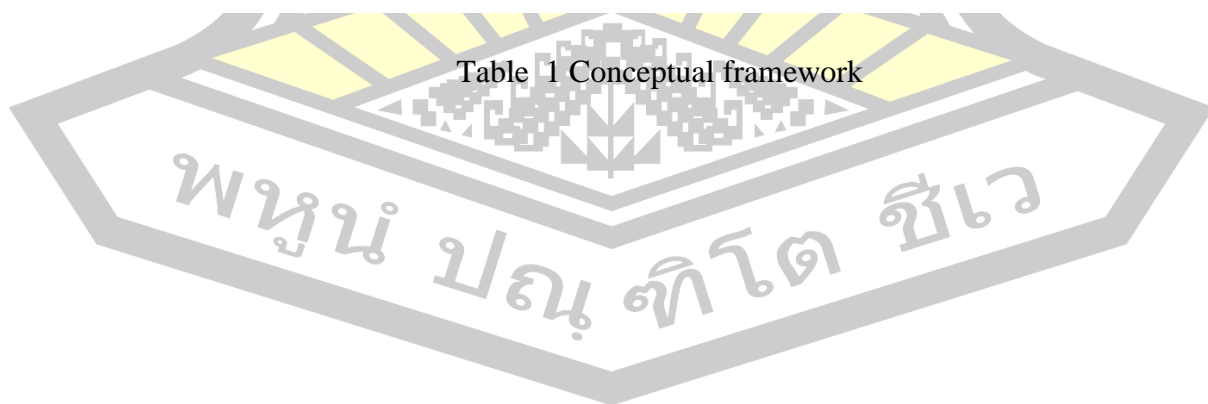
CHAPTER II

Literature review

2.1 Chinese culture/Chinese art

The Star Art Exhibition, briefly held in Beijing in 1979, opened up a wave of exploration in contemporary art in China, and the artistic style also changed accordingly. Subsequently, emerging exhibits that were influenced and nurtured by it indirectly called for exploration and changes in exhibition space design, posing more demands for exhibition space in art museums.

In 1985, the Youth Art Movement was launched in the domestic art community. The "85 Art Trend" inspired many young artists in China to learn, draw on, and refer to Western modernism. The enthusiastic creative atmosphere and research environment laid the foundation for the development of contemporary art in China.

1992 was a turbulent year for the development of contemporary art in China. The "Guangzhou Biennale", which caused a huge stir in the art industry, became a controversial annual exhibition topic. The exhibition itself also led to many controversies. However, focusing on the essence of contemporary art in the exhibition, people are more willing to pay attention to the issues related to the market and transactions brought about by this exhibition, The mutual relationship between "contemporary art" and "market" has for the first time impacted the old understanding in China, and indirectly affected the original structure of the Chinese art system. The discourse power of art has officially been connected with the bidding prices of auction houses and the voices of folk art reviews in galleries, and art, currency, and power are integrated into one.

In the 1990s, the final construction of contemporary art in China was not yet fully completed, but the art community has begun to notice the gradual rise of a form of "abstract expressionism different from the Western 1940s to the present". Due to the widespread awareness of emerging foreign goods, the term "postmodernism" has been used by creators to conceal their excitement of exploration, And this strange creative state also highlights the situation of contemporary art at that time: falling into

a state of centrifugation, without the difference between the core and edge areas, the joint stitching of old traditional concepts and emerging modern cognition, the mass creation of silent and weak element symbol patterns, and so on. However, on the other hand, the relatively disorderly art exploration environment has also caused many in-depth thinking and attempts, The method of easel painting has been introduced to domestic studios, and the concepts of installation art and performance art have sprouted. More exploration of contemporary art in China has been fully experimented with.

In 1993, the "Post 89 Chinese New Art" organized by artist Zhang Songren achieved continuous success in Hong Kong and overseas events. The embryonic form and complete understanding of contemporary art in China gradually improved with the deepening of marketization. However, this was not simply the successful communication and expression of "creative significance", but more importantly, it was the success of planners deeply rooted in the market society. The maturity of art quickly facilitated the maturity of goods, and this complete market transaction relationship began to be guided by economic development, affecting the transformation of domestic art museums and even the emergence of contemporary art museums in a specialized sense. In June of the same year, Italian Oliva planned the Venice Biennale and invited some domestic artists to participate, marking a high-level contact and cooperation between Chinese contemporary art and the Western art community. On the other hand, in March 1993, Berlin held the "Chinese Avant-garde Art Exhibition". In October 1994, the "22nd S ã o Paulo International Biennale" in S ã o Paulo, Brazil also featured many Chinese contemporary art exhibits, and Chinese contemporary art began to participate in the world art system as a newcomer.

In the first issue of Jiangsu Illustrated Magazine in 1998, an article titled "From Postmodernism, Postcolonialism to the Internet Age" was published. The typical postmodern issues explored by Habermas, Leonta, Arendt, and others have been leapt over by domestic art critics, and people have begun to try to express their own views on the Internet issue at the turn of the millennium, The 1997 Asian financial crisis, which swept through the country, also provided a unique creative background for contemporary art in China. Intense and sharp issues were temporarily

put aside, and artists and consumers were in a brief period of calm and passive confusion,

In 2000, the successful holding of the third Shanghai Biennale "Sea, Shanghai" marked the entry of contemporary art into the official cultural architecture system and gained universal recognition. Based on this, contemporary art in China has finally connected with the public culture of the general public, and with the help of the exhibition space of contemporary art museums, it has officially entered the perspective of the public and cultural consumption market.

In 2007, contemporary artist Xu Bing exhibited at the Metropolitan Museum of Art in New York, MoMA, and the Virginia Museum of Fine Arts, leveraging his immense influence and depth of communication between printmaking and contemporary art. He was awarded the Lifetime Achievement Award by the National Printers Association in the United States.

In 2008, contemporary artist Cai Guoqiang planned and designed the "Big Footprints" for the opening ceremony of the Beijing Olympics, bringing fireworks, a unique contemporary art creation technique that one is best at, to the grand event of the Olympics.

In September 2017, the documentary "Sky Ladder: Cai Guoqiang's Art" was released in theaters, and people outside the professional field began to realize the existence and preciousness of contemporary art in China. Contemporary art gradually ushered in more trends.

The current development of contemporary art in China has gradually determined its own development direction. The combination of government funding for public culture and art education, private enterprise economic investment, and a more youthful consumer market has led to the gradual emergence of contemporary art exhibitions and art museums in people's lives. The study of contemporary art in China cannot avoid the discussion of the relationship between subjectivity and ontology. Currently, China is still in a state of catching up, but this state also provides some room and buffer for the development of contemporary art in China: the concepts and expressions in Western contemporary art are not entirely applicable to China.(Yang Zijiang, Master's Thesis of Hunan University, May 6, 2021)

2.2 Knowledge related to research

(1) Touch Designer Visual Culture

Digital media art refers to the use of digital information processing equipment with computers as the core, through various software and hardware creation platforms, to describe and implement artistic creation concepts, and ultimately complete the creation and dissemination of artistic works based on digital technology. Tracing the development history of digital media art, in the early 1950s, based on the principles of CNC machine tools, people realized the idea of using drawing pens instead of cutting tools on CNC machine tools, invented the world's first tablet plotter, and thus opened the door to the history of computer-assisted plotters replacing manual drawing. The development of digital media art has now entered a new form of development where art forms are more common and accepted by the public. The difference from traditional art forms is that digital media art is based on computer technology for various creations, such as mature digital painting art, digital imaging, 3D animation, digital music, etc., all of which rely on computer technology for creation. As is well known, most fields that rely on computer technology essentially provide us with a virtual world, and digital media art is no exception. In professional terms, digital media art adopts a different means of artistic creation from traditional ones - digitization, and relies on internet technology to enable art recipients or viewers to experience a new artistic world through the internet. This new artistic world is essentially a virtual digital world. Having understood the basic concepts of digital media art, it is not difficult to summarize some basic characteristics of digital media art.

1.1 Digital media art relies on the development of digital technology. The characteristic of digital media art can be summarized in one word as' digitalization '. Both the creative foundation of digital media art and the quality of works are highly dependent on the development of digital technology. In other words, the level of development of digital technology basically determines the level of development of digital media art. Digital media art no longer relies entirely on the artist's own artistic creativity and the artist's ability to objectify their creativity into works of art, just like traditional art. The difference between the two is that traditional art is more of a 'human art', while digital media art is more of a 'technological art'.

1.2 Digital media art has stronger interactivity. Digital media art exists based on digital technology and is presented to viewers through the internet, just like traditional art creation methods. In addition to this characteristic, digital media art also has a characteristic that traditional creative art does not have, which is interactivity. Traditional artistic creation has a clear unidirectional characteristic, where artists create and present the results to the audience who appreciate the work. Digital media art often enables products created through digital technology to interact with the audience. For example, everyone has had the experience of clicking and opening a webpage (webpage design and development is a specific application example in digital media art). Every time you click the mouse, the interface will generate a corresponding response. For example, clicking the play button to open a video will respond to your action, that is, playing the video. This interactivity greatly enhances the participation enthusiasm of viewers of digital media art works.

1.3 Digital media art has the characteristic of virtuality. The virtuality of digital media art is easy to understand. On the one hand, the creation of digital media art cannot be separated from the virtual platform of the Internet, especially in the current era of rapid development of the Internet; On the other hand, the presentation process of digital media art works is presented to the public through the virtual platform of the Internet. （Innovation of Interactive Media Art Forms）

(2) The Formation of TouchDesigner Visual Culture

The occurrence and development of Touch Designer art in China and even internationally are closely related to the computer revolution, and it itself is closely related to the development of new media art. Therefore, there are different names for the concept of digital art, which can indicate the broad and open nature of this field, such as computer art, interactive art, Telepresence Art or Telematic Art, generative art, software art, network art, game art, virtual reality art, robot art, and even artificial life art. This is an open and full of unknown possibilities, a place where new artistic knowledge is generated. It expands our knowledge boundaries about art and enriches and changes our sensory cognition. In the context of China, electronic media based video art first emerged in the early 1990s, and digital art based on digital technology began to emerge in the late 1990s, such as Feng Mengbo's game works, It is a change to the game program. After the release of Flash 4 in 1999, a group of producers

emerged in China. Strictly speaking, the development of Chinese Touch Designer digital art (digital new media art) occurred in the 21st century, becoming the third wave of new technological art after video art and new media art. It is seeking its own open aesthetic principles and gradually becoming a field that overlaps and distinguishes with video art, new media installations, and electronic art. As Touch Designer digital art, Although it has inclusive and borderless artistic characteristics, how to become a new generation of independent art that is self consistent, how to have innovative thinking and the ability to explore unknown fields, is a new problem facing artists. With development, it will also increasingly have its own unique character. At present, Touch Designer digital art is widely valued by society and is widely used in fields such as film production, television communication, advertising production, online databases, and online games. In terms of educational settings, the Central Academy of Fine Arts, China Academy of Fine Arts, Communication University of China, Beijing Film Academy, Beijing Institute of Fashion, Sichuan Academy of Fine Arts, and others have successively established relevant majors, Intended to promote art innovation education and talent cultivation related to digital technology. On September 11th this year, the China Academy of Fine Arts established a cross media art academy, focusing on strengthening the integration and convergence of relevant new media, new technologies, new knowledge, and new numbers, in order to explore new possibilities in art and cultivate new types of artistic talents.(ARTLINKART)

(3) Contemporary Chinese Art

In the eyes of Western scholars, contemporary art knows no borders, but due to historical differences in different countries, contemporary art in different regions and countries still has differences in artistic language and spiritual connotations. As far as China is concerned, the dual entanglement between tradition and contemporary, as well as between the local and the world, makes the contemporary nature of Chinese art exhibit distinct mixed characteristics. Therefore, there are two standards for evaluating Chinese contemporary art, domestic and international. Some creative themes and artistic styles that have been completed in the West and belong to the category of modernity, such as abstractionism, still have value in contemporary Chinese art; Even classical realism, as the embodiment of humanism and rationalism,

which is the origin of Western culture, still plays a role of "continuous enlightenment" or "conceptual tutoring" in contemporary Chinese art. The interaction between deep-rooted cultural departmentalism and unstoppable universalism has led to a new artistic trend called "Globalocalism" in many countries, including China. In short, global regionalism is the artistic concept of expressing universal human nature and universal values in local languages.

Installation art, performance art, and digital art (including imaging, photography, and online art) are the main categories of Western contemporary art, but in Chinese contemporary art, easel art, including painting and sculpture, still occupies a prominent position. In artistic creation, ideas are always greater than language, and what kind of ideas there are will produce what kind of language. The history of human art development is not only a history of the evolution of human spirit but also a history of the transformation of art media. The development of civilization not only brings new life topics to artists, but also provides them with new creative methods. With the application of various new scientific methods, especially computer technology, contemporary art has increasingly broken through the category of visual perception and developed into all perceptual fields including hearing, touch, smell, and taste. In my opinion, contemporary art should be referred to as "All Sensual Arts" or "Multi Sensual Arts". Total perception art is not only a complete betrayal of the established art collection system - such works cannot be collected, but also poses a great challenge to the dissemination of art works - printed copies cannot present the characteristics of the works, and even imposes strict requirements on the way art is accepted - full perception art requires the true presence of critics and visitors. In addition, the interaction between artists and their works with the audience is also a new trend in contemporary art creation and appreciation methods.

In addition to the changes in artistic characteristics such as themes and material methods, new ways of creating and disseminating contemporary art have also emerged. Team based production and commodity based marketing have increasingly become common development strategies adopted by contemporary artists. The external relationship of art has also become unprecedentedly complex. The relationship between art and fashion, art and market, art and goods, and art and life has never been so inseparable and integrated as it is today.(Wang daunting 2021)

(4) Contemporary Visual Art

The current era is a digital era, with the emergence of a full range of media forms such as digital television, the Internet, and mobile phones, representing the emergence of a new digital media context. The emergence of the digital media context has brought unprecedented impact to contemporary visual art, and it is impacting the development of visual art with an irresistible force. In the context of digital media, visual art has transcended the limitations of time, space, and region, and has also lifted the barriers of communication between different languages and cultures. Visual art has developed into the era of digital media, breaking through various taboos and constraints faced by traditional art, truly reflecting the artistic and innovative characteristics of art creation in the digital age. The dissemination of modern art is often based on high-tech digital media, and visual art is no exception. In the context of digital media, future visual art will mainly be disseminated through interactive communication such as digital technology, network technology, and mobile internet as the main carriers and forms.

The arrival of the new media era has shifted the starting point of innovation and reform in visual art to human visual instincts and desires. In fact, visual art has a subtle impact on human aesthetic cognition. In the new media environment, visual art has been endowed with characteristics such as entertainment, commercialization, and replication. The development of modern visual art is distorting traditional aesthetic concepts and changing traditional visual art concepts to varying degrees. Visual art is undergoing reform and innovation. To achieve innovation in visual art in the context of digital media, it is necessary to change the creative thinking and expression methods of visual art, and use new forms to give people strong shock and visual impact, in order to meet people's pursuit of modern visual art. To innovate visual art in the context of digital media, firstly, traditional visual art resources should be effectively integrated and selectively integrated into modern concepts, changing their expression and dissemination methods to make them conform to the aesthetic perspective of modern people. The digital media context provides a reliable communication tool for visual innovation. In the context of digital media, innovation can consider incorporating virtual reality technology to achieve the development from image art creation to the visual 3D art world, bringing people an intuitive and multi-

dimensional visual experience. On the other hand, strengthening the use of computers, creating thinking art through computers, allowing people to experience a virtual digital art impact, and building an interactive art through the use of computers. For example, establishing a website for visual art dissemination allows people to upload their creations to the website and share them with others. This not only achieves the widespread dissemination of visual art, but also promotes the development of visual art in China.

(5) Knowledge about application model

The application model is the basic framework and organizational form of activities, and is the general term for the methods and means that teachers guide according to certain laws and steps in the create process. The application model is the core of create design, which can help teachers effectively organize create content, design create activities, and provide methods and skills to guide create.

A application model is a product of the combination of create. theory and practice. It is not only a guiding tool for workers in the create process, but also a guiding principle and standard for create activities. application model can help workers better understand create objectives, determine create content, select create methods, and evaluate create effectiveness. At the same time, application model can also help students better understand learning tasks and improve learning outcomes.

The application model has multiple classification methods. According to the characteristics of creative activities, the application model can be divided into direct guidance mode and indirect guidance mode. Direct guidance mode refers to the direct participation of creators in the creative process of their works, such as teaching mode, demonstration mode, etc. Indirect guidance mode refers to the creative process in which creators design learning environments and provide learning resources to guide creativity, such as inquiry mode and collaborative learning mode.

The application model can also be classified according to different stages of teaching activities. Common application models include heuristic mode, discussion mode, problem solving mode, case mode, etc. The heuristic model emphasizes promoting learning by stimulating users' thinking and exploration; The discussion mode emphasizes interaction and communication between users; The problem-solving

model focuses on cultivating users' ability to solve problems; Case models guide users to learn through specific cases

The selection of application models should be determined based on factors such as teaching objectives, subject characteristics, and student needs. Different application modes have different characteristics and applicability, and users need to choose and apply them according to specific situations. In addition, the application model is not static and can be flexibly adjusted and improved according to practical needs.

The application model is the basic framework and organizational form of creative activities, and is an important tool for artists to guide artistic creation. The selection and application of application models are of great significance for improving creative effects and cultivating the abilities of others. Users should flexibly use different application models according to specific situations to promote the comprehensive development and quality improvement of their creative works. （Media and Symbolic Theory of Digital Media2018）

2.3 Laws and regulations

The plagiarism of TouchDesigner works should be classified into the category of media art plagiarism. In the official course of Shanghai TEA, authorization for works will be delegated, and the college can modify the original work and create it again. In other fields, TouchDesigner plagiarism is common, which is also a serious problem mentioned in this article. TouchDesigner works also belong to personal copyright and infringe on the copyright of others, and they will bear civil liability for infringement, It is necessary to compensate the copyright owner for their losses, stop infringement, apologize, and plagiarize, including plagiarism of all or part of others' works, which has a certain degree of concealment. Plagiarism is an act of infringing on the copyright of others. Generally speaking, rights holders are more likely to detect the theft of physical property and promptly protect their rights, while discovering the theft of intangible property such as copyrights is more difficult. In practice, although plagiarism is difficult to identify, according to the provisions of China's "Decision on Punishing Copyright Infringement Crimes", relying on plagiarism is not impossible:

For the purpose of making profits, if one of the following circumstances infringes on copyright, has huge illegal gains or other serious circumstances, he shall be sentenced to fixed-term imprisonment of not more than three years, criminal detention, and shall also, or shall only, be fined; If the amount of illegal gains is huge or there are other particularly serious circumstances, they shall be sentenced to fixed-term imprisonment of not less than three years but not more than seven years and shall also be fined

（1）Copying and disseminating their written works, music, movies, television, and video recordings, as well as computer software and other works without the permission of the copyright owner

（2）Publishing books with exclusive copyright enjoyed by others

（3）Whoever, without the permission of the producer of audio and video recordings, copies or distributes audio and video recordings of audio and video recordings produced by the producer of audio and video recordings (4) produces or sells artworks signed by others knowingly sells infringing copies as stipulated in Article for the purpose of profit, and the amount of illegal gains is relatively large, shall be sentenced to fixed-term imprisonment of not more than two years, criminal detention, and shall also, or shall only, be fined; If the amount of illegal gains is huge, he shall be sentenced to fixed-term imprisonment of not less than two years but not more than five years and shall also be fined. Those who commit criminal acts as stipulated in this decision shall be fined, and all infringing copies, illegal gains, and materials, tools, equipment, or other property mainly used for copyright infringement crimes owned by units and individuals shall be punished in accordance with the provisions of this decision. The directly responsible supervisor and other directly responsible personnel shall be punished in accordance with the provisions of this decision. If the in fringee suffers losses due to the crime of committing this decision, criminal responsibility shall be pursued in accordance with this decision, And award compensation for losses based on the circumstances.

The legal standards of plagiarism can never keep up with the changes in music forms. The Copyright Law of China clearly stipulates that the rights of creators of original music works should be protected. Those identified as plagiarism shall be

punished and the original author shall be compensated for their losses.era. (https://china.findlaw.cn/ask/question_jx_705123.html)

2.4 Research Area

From the perspective of three-dimensional time and space, the research field of this article is the domestic image media art on the timeline. From the perspective of abstract concepts, the research field of this article is the theoretical study of digital media using Touch designer as the carrier. From a regional perspective, the research areas of this article include media developed areas such as Beijing, Shanghai, and Guangzhou in China, as well as areas touched by new artistic trends. In Beijing, the user groups for Touch Designer include higher education institutions such as Tsinghua University, Central Academy of Fine Arts, Communication University of China, artist groups, students, and personal studios. The user groups of Touch Designer in Shanghai include South China University of Technology, Fudan University, and Shanghai has the largest and most authoritative Touch Designer institution in Asia, as well as training schools. They undertake most of the visual effects production for high-end press conferences. Unlike Beijing, Shanghai's user group has emerged as a science and engineering group, which is different from traditional art workers. Science and engineering professionals have a better understanding of computer programming languages, Better at solving software problems that arise during the use of Touch Designer, but this group lacks artistic aesthetics. Touch Designer is an extension of the Shanghai user group in Guangzhou, and Guangzhou Academy of Fine Arts and related schools have successively offered relevant courses and social practice activities.

National Project Center, Central Academy of Fine Arts, School of Fine Arts, Tsinghua University, represented by artists Cai Jin, Wu Jianan, Xu Bing

The largest Touch Designer community in Asia, TEA community, Digitalfun, Huazhong University of Science and Technology, Shanghai Academy of Fine Arts, represented by Chen ruokun, Fei jun, Frank

University practice area, Guangzhou Academy of Fine Arts, represented by artists Liu Kun, Zhengchengfeng, Lu siyi

Map Overview

Figure 1 Research Area Source: Personal production

2.5 Thematic theories

Theory 1 Media and Symbolic Theory of Digital Media

1. Media theory is the core of understanding digital media art theory

From the perspective of media evolution history, digital media art should belong to a broad category of media art. Media art, as the "art of the mechanical replication era" (in Benjamin's language), can be traced back to the birth of Western modernism in the late 19th century. Unlike traditional handicraft art such as painting and sculpture, media art relies on technology, goods, and media. Through non-traditional art forms such as photography, movies, posters, posters, advertisements, printed images, and mechanical installations, art is closely linked to life, art, and consumption, which has inspired and influenced the Western modernist art trend for nearly a century. For example, the Futurism poster in the 1930s (see Figure 1), Duchamp's power device, Rochinko's and Hamilton's photo collages, Lichtenstein's, Andy Warhol's silk screen pop and Bai Nanzhun's video device are all examples of this art form. In the 1950s, with the prosperity of post-war capitalist Culture industry and mass media reaching a historical peak, media art, whether based on print media, optical media, electronic media or digital media, usually contains such elements as machinery, technology, mass media, democracy, communication, popularity, deconstruction, spoofing, collage, fashion, commerce and entertainment. Therefore,

understanding digital media art inevitably requires tracing the concept and technological history of media art. Renowned scholar in new media research who has written "The Virtual Life of Movies," "Interpretation of Numbers," and "Philosophy after the Birth of New Media David Rodvik, a professor of Harvard University, believes that "from a contemporary perspective, film should only be regarded as a branch of media archaeology that originated in the 19th century, and a branch of the overall history of the development of various complex media technologies. It includes Genealogy of computing technology, and Genealogy of scanning, electronic recording and transmission." He further points out that, Every medium of art is constantly innovative, and we can form a new concept by providing a new material, leading us towards a new artistic medium. Similarly, Chinese new media art researchers such as Qiu Zhijie have also studied the development of new media art from the perspective of the evolution history of art media. He summarized and hinted at a more universal law of media art development by examining the four stages of video art development - from utopia to grammar, and then from poetics to its marginalization. Qiu Zhijie pointed out that new media art originates from the contradiction between modernism and technology: on the one hand, modernism is full of Utopian enthusiasm for new technology and the new world, resulting in Futurism, constructivism and cubism of technology worship aesthetics; On the other hand, out of fear of machines and nostalgia for the original paradise, the nightmares of Dada and Surrealism came into being.

Marshall McLuhan, the master of Communication studies, has a view on the evolution of new and old media, which helps people to understand the essence and significance of digital media art more clearly. McLuhan pointed out that "any new technology must change the entire human environment and encompass and embrace the old environment. It transforms the old environment into an art form." McLuhan believed that the media in the long river of human history has always "pushed the waves before the waves", and the contradictory relationship between them includes the evolution process of both excluding (new media makes old media old and outdated) but accommodating (new media uses old media as its content), from speaking, writing Printing to electronic media is no exception. McLuhan's contribution made people realize that 'media is information', and the 'content' of all

media is another media. Borrowing from McLuhan's ideas, it can be seen that digital media in contemporary society is precisely in the process of utilizing, transforming, deconstructing, collage, and reconstructing traditional media (such as text, images, prints, movies, animations, music, dramas, or performances), using old media as content or artistic forms, and thus constructing its own "digital" media artistic characteristics and system. Therefore, media theory is the key to understanding and mastering the essence of digital media art.

2. Semiotics and Linguistics are Tools for Constructing Digital Media Art Theory

People have various names for today's era: globalization era, consumption era, post-modern era, post industrial era, information era, digital era, picture reading era, video era, visual culture era... It may be summarized that this is an era of digital Media culture. In the context of globalization, networking, and transnational capitalism, electronic and digital media have led to the emergence of virtual reality and the advent of the digital age. New features such as multimedia, hyperlinks, virtuality, and interactivity have led to the emergence of a maze like and mirror like "fragmented culture" feature, and traditional cultural media models have encountered unprecedented challenges. Just like the postmodern theory known as the 'New McLuhan'.

As Jean Baudrillard, the pioneer, pointed out, contemporary society is a "society of the sim ulacum", characterized by a surge in media symbols, resulting in an inversion of the relationship between representation and reality. Baudrillard drew lessons from Saussure's linguistics and Semiotics, and made an in-depth study of the meaning of media symbols. Baudrillard believed that, unlike the early capitalist machine production of products or artworks, modern society's reproduction is a proliferation of symbolic images without a source or source; Art and media use symbols to make reality disappear and conceal its disappearance. In his view, "in a society where symbols rule everything, all existence should be the existence of symbolic objects, with reality, original elements, and primacy all gone. Virtual is the true existence of this society." Digital media art is a portrayal of contemporary society's "virtualization". This art form (such as virtual reality, multimedia interactive devices, software art, and network art) has all the aesthetic features and surreal

experiences of virtual and immersive. With the help of powerful computer technology, the ability of digital media art to construct symbols or virtual has greatly surpassed the issue of artistic reproduction, making artistic creation not only limited to "reproducing reality", but also no longer requires a real context. For example, the 2010 movie Avatar created the beautiful wonders of Pandora and the image of the exotic Na'mei people by virtue of powerful digital modeling, digital 3D virtual photography and "expression capture". This virtual existence created entirely by virtue of conceptual design and digital technology just shows the importance of digital media art in Semiotics and virtual aesthetics.

Lev Manovich, a new media art theorist, pointed out that "in the computer age, database plays a role as a cultural form. The information used by a program is the output of the user's cognitive process.（" September 13, 2011 Source: Art China）

He also mentioned that the essence of digital media art lies in its embodiment of a digital and virtual existence. Nonmaterial or Signedness is the basis of this way of existence. From this fundamental property, all other characteristics of digital media at the material level can be derived, including image thinking patterns, nonlinear expression, the spatiotemporal characteristics of the ongoing time, and interactive artistic experiences. Mannovich further believes that digital media has five principles: digitization, modularity, automation, variability, and encoding and decoding. Numerization is the primary principle. Digital media can be described as digital functions, which can be calculated or programmed using numerical values. And digitization makes it possible for the real world to "disperse, reorganize, and synthesize". Because of this digital characteristic, the virtual existence and interaction of Digital art become possible. As David Rodvik pointed out in "The Virtual Life of Movies," the meaning of virtuality far exceeds what people take for granted in a general context. To construct the theory of digital media art, we must understand the meaning of the virtual world, and Semiotics and linguistics are the tools by which people can understand the virtual world.(Semiotics and linguistics are tools for constructing digital media art theories)

3. Theoretical and Practical Research Fields of Digital Media Art

According to the principles and viewpoints of media theory, linguistics, Semiotics, Communication studies and art, we can further sort out the research topics

of the basic theory of digital media art. Its content should include: ① Research on the Ontology of Digital Media Art. This includes the definition, categories, characteristics, aesthetics, interdisciplinary fields, and expression patterns of the discipline. Research on the development history of Digital art. Including research on history, events, and development trends, exploring the evolution laws of media and "media art" Research on the Methodology of Digital Media Art Creativity. Including Case study of advertising, film and television, media companies, creative thinking, work analysis, research and statistics, audience behavior and psychological research, as well as design steps and processes. Research on the application field of digital media art. The focus is to clarify the relationship between disciplines and employment, and to demonstrate a systematic and scientific approach to professional curriculum design, with particular emphasis on research in overlapping and overlapping application fields. In addition, some domestic scholars in the field of new media art, such as Professor Xu Peng, also suggest incorporating the ethnic characteristics of Chinese new media art into the research scope, proposing to "explore new media art theories with Chinese characteristics from China's new media art practice." This suggestion expands the theoretical research direction of digital media art from another perspective.

In order to further sort out and summarize the branches and interrelationships of digital media art in the application field, this paper summarizes and summarizes the structural system of digital media art as a media product through the information Visualization method, as shown in Figure 2, in combination with the current information on the curriculum and professional direction of colleges and universities in this field. The main subject content of digital media art is as follows.

(1) In the field of time based media, digital movies, television commercials, animations, dynamic media (titles, column packaging, MTV, etc.), Flash, DV, etc. belong to this category. According to Randy Clowford, a new media researcher and professor at Texas A&M University in the United States, this field belongs to the field of narrative logic, which is related to courses such as audiovisual language, montage theory, dramatic structure, character modeling, scenes, performance, editing, and media art history. They also have characteristics of popularity, commercialization, and entertainment, and are more focused on viewing.

(2) Interactive product field, including website design (blogs, shopping websites, experience centers, video networks, SNS communities, gaming communities, etc.)Mobile phone software design, iPad content design, electronic publications, multimedia products, Interaction design, Information design, UI interface design, etc. Its knowledge system belongs to database logic. Kruff believes that "in narrative logic, control is in the hands of the storyteller; in database logic, control is in the hands of the receiver,... so it is user control oriented." Therefore, this field focuses more on the research of user needs and interaction, including information architecture, visual communication, industrial design, Cognitive psychology, ergonomics, user experience Interface design and sociological anthropological methods.

(3) The field of interactive entertainment mainly refers to electronic games, online games, Installation artwork, interactive animation, virtual roaming, interactive wall art, etc. It has both the characteristics of "time-based media" and "interactivity", and is an art that focuses more on the "experience" of the audience or players. This part also overlaps with the above two areas.

(4) The extension field of Old media mainly refers to graphic design, photography, advertising, illustration and cartoon design based on paper media or outdoor displayInformation navigation design, etc. This field often places greater emphasis on the efficiency and richness of digital design tools. In addition, in Figure 2, computer creative languages, tools, or platforms in digital media art creation, publishing, and dissemination are represented by dashed lines, and their overlap with media product design can indicate the fields involved in these creative tools.(Theoretical Divergence and Typological Construction of Art Media Research2017)

Theory 2 Theoretical Divergence and Typological Construction of Art Media Research

1. Question raising: from communication media to art media

Media is written as medium or media in English. This word originates from the Latin medium and refers to the middle, which has been widely used in English since the late 16th century. In Modern English, medium, as a noun, has five meanings: the first meaning refers to the media, means and methods of spreading information, and its plural form is media; The second meaning refers to means, tools, and methods;

The third meaning refers to the materials and forms used in artistic creation; The fourth meaning is as a biological term, referring to medium, culture medium, and environment; The fifth meaning is written as' media ', referring to psychics, mediums, and wizards. In general, the "media" discussed by Communication studies refers to the medium of the first meaning, and most of them are written in the plural form of media, that is, the means and methods of information dissemination, such as television, radio, newspapers [3]. The "medium" discussed in art refers to the third meaning of "medium". However, in the Chinese context, researchers did not carefully distinguish the specific meaning of the term "media" when using it, often confusing the concepts of communication media and art media. Specifically, media refers to the Inter mirifica used in the process of information transmission, such as newspapers, radio, movies, television and new media developed on the basis of the Internet. Art media mainly refers to the media system composed of materials, tools, carriers, and symbols used in the process of artistic creation, dissemination, and acceptance. It is a fundamental category in art theory. Communication media and art media are two similar but different concepts. In the process of art dissemination and acceptance, communication media and art media may intersect, but in addition, there is a vast art world that communication media cannot touch. Therefore, we need to conduct more systematic and in-depth research on art media from the perspective of art theory.

Although the term 'medium' originated early, it was not until the 20th century that media research received widespread attention from the academic community. In 1964, McLuhan, a modern communication scientist, published Understanding Media -- On the Extension of Human Beings, which set off the first media research upsurge in the world. In recent years, with the application of various new media in the production and dissemination of art, the close relationship between media and art has also been increasingly valued. However, from the current research results, there are still many problems and shortcomings in the study of art media. First of all, there are many differences in the understanding of art media. There are still researchers who believe that art media only refers to broadcasting, television, movies, new media and other communication tools. Scholars who hold this view mainly look at media issues in art from the perspective of Communication studies, and such research has always been limited. Media theory originated in the 20th century, but media has existed since the

beginning of human civilization, and so has art media. In the long history before the emergence of radio and television, the development of art had its own existence in other media. Of course, there are also researchers who go beyond the scope of communication media and believe that the materials, materials, tools, etc. required for artistic creation should also be considered as artistic media. To address these differences, we need to re-examine the object of media from the perspective of art studies, distinguish art media from general media, and provide a more comprehensive and accurate definition of art media, which is the foundation for in-depth research. Secondly, media has become an issue that cannot be ignored in the current art research, but most of the current research uses the media theory and methods of Communication studies. Although there are many research achievements, they lack the thinking of art theory, so they cannot form a systematic theoretical system of art media. With the application of various new media in art and the continuous transformation of art forms, there have been some new changes in the relationship between the four elements of art. Among them, media plays an important role, and incorporating media into the art system for research is an objective need for the development of art theory at this stage.(Xie Xiaoyu. Introduction to Digital Media Art [M]. Beijing: Higher Education Press, 2014)

2. Theoretical Differences in Art Media Research

Due to the cross disciplinary influence of various disciplines, there are significant theoretical differences in current art media research, mainly manifested in both internal and external aspects. From the perspective of external differences, art media has different definitions in Communication studies, philosophy, science and other related disciplines in the past. Influenced by these disciplines, researchers have different priorities when discussing art issues. For example, art media research at the level of Communication studies has always equated art media with media, and the research vision mainly focuses on media issues in the process of art communication and acceptance, The focus of the research is on emerging arts represented by movies, television, and new media art, while neglecting traditional arts such as painting, music, dance, architecture, and sculpture; The focus of media research at the philosophical level is on philosophical reflection on issues such as material, technology, and tools in art. Influenced by these theories, art media research explores

the essence and characteristics of media more than analyzing specific art. In terms of research paradigms and theoretical terminology, it appears more difficult than general art research; The art media research at the scientific level mainly discusses the material materials, technologies and tools used in the art creation process through the latest scientific and technological means, which is highly technical and cutting-edge, and requires more professional Scientific literacy and skills. From the perspective of internal differences, there are also obvious differences in media research in art. In particular, there are several different understandings about the definition of art media. For example, the material theory represented by Hegel and Heidegger believes that art media is the material used in the process of artistic creation The symbol theory represented by Dewey and others believes that artistic media is a certain tone or symbol system formed after processing material materials, while Aristotle, Schiller, Bausanguine and others only explored the intermediary role of artistic media in art without conducting a specific analysis of its connotation. (Xie Xiaoyu. Introduction to Digital Media Art [M]. Beijing: Higher Education Press, 2014)

(1) The Theory of Media as a Tool

The study of media as an aesthetic or artistic theoretical concept began as early as the ancient Greek period. In the first chapter of Poetics, Aristotle proposed that "art is imitated through media" [4]. The difference between different Genre is that they "use different media, take different objects, and use different, but not the same way" [5]. He believes that some art uses one medium for imitation, while others use multiple media simultaneously; When using multiple media, some art uses these media simultaneously, while others use them for different parts. Specifically, painters and sculptors imitate colors and forms, rap artists use sound to imitate, instrumental music uses pitch and rhythm to imitate, epic poetry uses language to imitate, and drama uses various media such as rhythm, aria, and metrical writing. In the third chapter, he further proposed that "people can imitate the same object in different forms of expression of the same medium" [6]. For example, in the epic, the same language medium is used, which can be the first person narration, or the Third-person pronoun narration, and can also directly carry out the dialogue between people and objects. In Chapter 6, he emphasized that media is an important component of artistic works, using tragedy as an example. He believed that "tragedy must include the

following six elements that determine its nature, namely plot, personality, language, thought, scene, and aria" [7], where language and aria refer to the medium of imitation, scene refers to the way of imitation, and plot, character, and thought refer to the object of imitation. From the above discussion, we can see that Aristotle regards media as an important part of works of art and an important aspect of distinguishing Genre, and specifically analyzes the media used by different The arts and the different ways of using media.

When discussing the beauty of art, Schiller proposed that "the beauty of art is not nature itself, but only an imitation of nature in a medium" [8]. In art, the nature of the object is expressed through the medium, and the medium has its own personality and nature. When expressing the object, if the medium displays its own nature, the nature of the object being expressed will be endangered, Only when the nature of the medium is fully integrated with the nature of the object being represented, can the object be said to be freely expressed. If a statue exposes some stones, its natural nature will interfere with the expression of beauty; If the line drawing exposes the traces of the pen tip, paper or copper plate, the brush, or the hand using the pen, it will give a feeling of stiffness and clumsiness [9]. On the one hand, Schiller agrees with the role of media in artistic creation, and on the other hand, he also sees the reaction of media. However, from the perspective of art development, his reaction also has certain limitations. We can find many examples in the art history that deliberately reveal the "nature of the media", such as Constantin Brâncuși's sculpture Kiss, which "has no intention of covering up the physical characteristics of the stone" [10], and shows a primitive beauty through the roughness of the stone surface. Bao Sangkui (also translated as Bao Shankui) mentioned in his "Three Lectures on Aesthetics" that artists "rely on the medium to think and feel", "the medium is the special body of their aesthetic imagination, and his aesthetic imagination is the only special soul of the medium" [11], and emphasized that the pleasure and special ability of artists towards the medium have already begun to play a role in artistic conception and imagination, rather than just in practical operation. Contrary to Bao Sangkui, Croce proposed the aesthetic concept of "intuition is expression", emphasizing the intuitive expression of artistic creation, believing that "aesthetic facts are already completed in the processing of various impressions," while artistic communication is only an "additional task"

[12]. Bao Sangkui clearly denied Croce's viewpoint, emphasizing the indispensable role of media in the process of expressing emotions.

When discussing modernist painting, Greenberg believed that the scope of each art is consistent with its unique media characteristics. Within this scope, art maintains its own special effects, driving out the effects of other art media to maintain its "purity" [13]. He distinguished between traditional painting and modernist painting from the perspective of artistic media, believing that traditional painting masters view the limitations of artistic media as negative factors and try to conceal them in their works of art, while modernist painting views the limitations of artistic media as positive factors, deliberately revealing the traces of media in their works of art. Greenberg emphasized that traditional art and modern art are always in a continuous state, and the difference lies in their respective attitudes towards the media [14].From the above analysis, it can be seen that Aristotle et al. did not specifically limit the scope of artistic media coverage, but instead used media as a tool to complete artistic creation activities, emphasizing more on the intermediary role of artistic media. (Hal Foster, "Round Table: The ProjectedImage in Contemporary Art", October, no.104spring 2003, p.93.)

(2) Media as Material Theory

Material materials are an unavoidable topic in the study of artistic media, and theorists usually approach them from the perspective of material materials. For example, Hegel, Heidegger, and others have repeatedly discussed the issue of materials, but have not made specific distinctions when using the concepts of material materials and artistic media. In their discourse, the words "material" and "media" are often interchangeable. When discussing the classification standards of art, Hegel talked about the media of art, believing that "the true standard of classification can only be determined based on the essence of the work of art, "Since works of art will appear in the perceptual reality, it has obtained the characterization of existence for feelings, so the characterization of these feelings and the Objectification material or media on which works of art are based and corresponding to these feelings will inevitably provide criteria for the classification of various arts" [15]. Based on this standard, he divided his works of art into five categories: architecture, sculpture, painting, music, and poetry. For example, sculpture uses stone as the medium,

painting uses color as the medium, music uses sound as the medium, and poetry uses language as the medium [16]. Hegel often equates media and materials in his discourse. The materials he said include both material materials such as stone and Signedness materials such as language.Heidegger believed in "The Origin of Works of Art" that all works of art possess the characteristics of objects: There are things made of stone in architecture, things made of wood in woodcut, colors in painting, words in language works, and sounds in music works. In art, the element of objects is so firmly present that we have to say that architectural art exists in stone, woodcut exists in wood, painting exists in color, language works exist in words, and music works exist in sound In fact, the "object" he is talking about is an artistic medium, and artists create art through materials with different characteristics.This viewpoint has also received positive responses from Chinese aestheticians and art theorists. For example, when discussing communication activities in artistic creation, Wang Chaowen believed that artistic communication requires the use of material materials to shape images, and artists also need to "master the performance and laws of certain material materials" when conducting artistic communication. For example, musicians need to use the rhythm and rhythm of sound to convey, and sculptors need to use marble Bronze and other material materials are used to convey, while painters need to use material materials such as colors and lines to convey. Wang Chaowen emphasized the important role of material materials in artistic creation, believing that artists should fully utilize materials and "follow the laws of specific materials as artistic media" in order to better carry out artistic communication activities. His discourse basically equates the concepts of material materials, material media, and artistic media, without a specific analysis of them. In "Three Realities in Artistic Works", Judy believed that art is "an artificial product composed of certain material materials. The so-called 'work' refers to the use of certain media means to store ideological and emotional information in a certain material form outside of oneself, so that people can appreciate it" [20]. He takes poetry as an example and proposes that artists should combine media forms when carrying out artistic conception, which in a sense pre regulate the content of artistic works.(Discussion on the Development and Essence of Digital Media Art2022.6.15)

3) The Theory of Media as a Symbol

Contrary to the above viewpoint, some theorists have made a clear distinction between material materials and artistic media, believing that artistic media is not equivalent to material materials. For example, Aldridge, Dewey and others believe that the art media is not the material itself, but the further processing of material materials. Aldridge also put forward the difference between natural materials, artistic materials and artistic media. What he said is that the material refers to the natural things that have not been artificially made. Artistic materials are the material materials that have been artificially made and risen to the tool level. Art media is a certain tone formed by the convergence of the characteristics of different artistic materials.Aldridge distinguishes between art materials and art media, and believes that material itself (i.e. unprocessed, naturally existing material) is not art materials. Only "appliances" that have been produced or manufactured to serve artists can be called art materials, such as brushes, pigments, colored crayons, oil canvas in painting, piano, violin, flute, Clarinet and other musical instruments in music. But these artistic materials cannot yet be considered as artistic media. The artist first comprehends the characteristics of each material element - color, sound, structure - and then harmoniously combines these materials to form a composite tonality This is the medium through which artistic works are formed... Artists do not create a medium, but only create with the characteristics of the medium or the tone of the basic material elements. In this basic sense, these characteristics are the medium of the artist [21] Aldridge emphasized that art media is the synthesis and understanding of art materials, and artists use the characteristics of art materials to create. But Aldridge did not clarify what this trait was.(zhihu https://zhuanlan.zhihu.com/p/93238981)

Theory 3 Teaching Practice Theory Using Digital Media and Interactive Software as Media

The Current Situation of Digital Media Art Teaching

Compared with other traditional disciplines, the digital media art major has strong comprehensiveness and distinct application attributes. However, as an emerging discipline, the digital media art major started relatively late and its system is not perfect enough. There are still some problems and deficiencies in the teaching process, mainly reflected in three aspects. Firstly, the training objectives for

professional talents are not clearly defined. The digital media art major is an interdisciplinary field, and the knowledge reserve and ability requirements for professional talents are also diverse. This has led to some universities setting training goals that are too broad and lack specificity. Secondly, the setting of the teaching system is unreasonable. The subject content of the digital media art major is relatively complex, including multiple art courses such as art design, plastic design, film and television production, web design, as well as information technology courses such as computer technology, digital image processing, multimedia technology, and other general courses. Some universities may encounter problems such as incomplete but not precise, and miscellaneous but not specialized in course design. Under such teaching settings, it is difficult to allocate students' learning time reasonably, and the difficulty and burden of learning will also increase, making it difficult to achieve ideal teaching results. It is also difficult to quickly translate the knowledge learned into practical applications in future employment, which is not conducive to the healthy development of students and the industry. Finally, it is difficult for the teaching staff to meet the actual market demand. At present, the professional teachers in this major are mainly full-time teachers with excellent professional quality and high teaching level. However, many people lack practical experience in the industry, which leads to insufficient integration of teaching content with market demand and difficulty in adapting to the rapid development of the digital media art industry.

Reflections on the Teaching Practice of Digital Media Art

Theory and practice are mutually reinforcing and complementary, and only by balancing theoretical knowledge and practical activities can we ensure the sustainable development of education. The digital media art major is a technical discipline that should achieve the unity of teaching theory and practical application. The educational goals of the digital media art major should be to consolidate students' theoretical foundation, enhance professional practical abilities, and strengthen the integration of theory and practice. The combination of theory and practice will change the traditional "cramming" teaching mode, improve students' learning enthusiasm, truly play the role of education, and also improve the overall business literacy of the industry, which is conducive to healthy competition and development in the field of

digital media art, and achieve a win-win situation between students' interests and social benefits.

Firstly, regarding the setting of training objectives. The training objectives are the basis and core for the subsequent development of digital media art education. Only with clear training objectives can we ensure the high-quality development of educational work. At present, many media and comprehensive universities have opened digital media art majors, and some schools are adding this major. There are certain differences in the advantageous disciplines, faculty allocation, and institutional systems of different universities. In order to better carry out the education work of digital media art majors in different universities, improve teaching quality and efficiency, the setting of training objectives should be combined with the advantageous teaching resources of different schools. For example, some schools with relatively high rankings in computer science should fully leverage their professional advantages and relatively lean towards digital media technology in student training goals, with a focus on cultivating students' practical skills in information technology, supplemented by the cultivation of artistic creativity ability; Art colleges should rely on the deep foundation of their own art majors, focus on cultivating students' artistic creation literacy, and support it with the cultivation of information technology practical skills. Developing training objectives based on the characteristics of universities can help improve students' overall quality and better achieve the unity of theory and practice in the teaching process.

Secondly, regarding the establishment of practical courses. Curriculum design is an important means to achieve the organic integration of teaching theory and practice. The digital media art major has a wide range of disciplines and diverse content, and it is necessary to ensure rationalization and targeted curriculum design. Firstly, more practical courses should be added on the basis of emphasizing theoretical learning. The digital media art major is a highly applied discipline, and practical skills should be gradually taught in the early stages of student development. Students should learn theory while being appropriately exposed to practice. This not only helps students master practical application skills as soon as possible, but also deepens their understanding of theoretical knowledge in practical operations. Secondly, the practical courses for senior students can be more refined, such as setting

up a content system in multiple directions, allowing students to make choices based on their own learning interests and future employment goals. This can more fully mobilize students' enthusiasm, improve their learning efficiency, and thus provide society with more talents that meet the needs of the industry.

Finally, regarding the construction of the teaching staff. Teachers are the guarantee for teaching, and there is a large amount of practical content in digital media art courses. Teachers should not only have solid basic theoretical knowledge, but also master rich practical operation skills, and should closely follow the actual employment needs of the industry. Therefore, it is necessary to strengthen the construction of the teaching staff of digital media art specialty. At the same time, the double Mentorship can be considered in the training process. The theoretical basic content and some practical courses are taught by the school instructors, and the practical courses related to the industry are explained by the industry, reviewed and coordinated by the school instructors, so as to achieve the best teaching effect.(Chinese Writers Network 2011)

Theory 4 Aesthetic theory

The aesthetic of digital art is determined by the characteristics of creative media, as its emergence and development are closely related to the economy. It differs from traditional creative art in terms of art popularity, fashion, and pursuit of capital. It does not require a lot of time and mainly aims to achieve artistic creation with originality. In digital media art creation, consumerism culture affects the efficiency and benefits of art creation, which is also a choice to achieve more convenient creation through limited resources. Digital media art is presented in the form of technology, which has a certain artistic compatibility and can showcase unique artistic works for people. For example, modern online advertising design works, game design works, animated short films, etc. all have the characteristics of digital media and also have their own artistic charm.

(1) The Intersection and Fusion of Digital Media Aesthetics

Digital media art creation is actually the intersection of computer science and other disciplines, showcasing artistic works through various forms and digital content. In the study of digital media aesthetic art, the use of digital media tools for creation requires people to learn various creative tools, such as audio acquisition, image

processing, digital graphics, production software and tools, analyze the aesthetic needs of the public, and create works and service products with digital aesthetics based on artistic design and creation laws. Digital media art is created by combining information, media, computer and other technologies.The aesthetics of digital media art include aesthetic approaches in fields such as music, art design, film, literature, etc., and also have an impact on these traditional forms of artistic expression. Under the influence of digital art, traditional aesthetics has presented various artistic charms and also formed the aesthetic framework for digital media in this era. Digital media art is a combination of various forms of artistic aesthetics, forming its unique digital aesthetic consciousness. Digital media art has high practical value, and most digital media art products have usage functions. For example, the use of products in the entertainment industry, product displays, online works, and other areas. At the 2010 Shanghai World Expo, many digital media art works were showcased, as well as the entertainment and service functions of digital media art.

(2) Aesthetic Analysis of Popular Digital Media Art

The creation of art has always been a minority, and if an artistic interaction becomes popular in the future, it will also be the time to end this art. However, digital media art is not the end of mass aesthetic art. Under the influence of modern aesthetics, it is a favorable condition for the development of digital media art. Modern aesthetics mainly analyzes the appreciation and creation of traditional art as a medium, which is a material art. Aesthetics views the modern artistic and cultural environment from traditional theories, and displays digital media art through non material art media, which will also have an impact on people's theory and reality of art aesthetics.The theory of modern aesthetic aesthetics has been greatly influenced by the times. Firstly, it is through the form of artistic expression that the aesthetic of a work of art is judged, in order to distinguish it from other phenomena. Modern art is the process in which the viewer realizes spiritual enjoyment from an aesthetic perspective. In addition, there are some scholars with different perspectives who believe that the appreciation and creation of art forms in the postmodern digital media art and cultural environment is the best way to express postmodern phenomena. Digital media art has had a significant impact on the selection and creation of traditional artistic values. For digital media art, the boundaries between authority and

non authority, originality and reproduction are completely blurred through software pasting and copying. Creators have also gained a new attempt and experience from digital media art. So, some scholars believe that in the digital age, people are gradually forming a postmodern digital world art expression mode, allowing viewers to experience digital art in a new way. Moreover, digital art can better showcase the efforts of creators, attract more and more people to understand art, provide a good artistic aesthetic environment for people, and achieve the popularization and democratization of artistic aesthetic activities. Due to the popularization of digital media art, it not only increases the audience of creators, but also strengthens the difficulty of artistic creation.

(3) The Participatory Nature of Digital Media Art Aesthetics

Digital media art has significant interactivity. For the appreciation of digital media art, people are no longer limited to traditional art appreciation models, and digital media art has gradually narrowed the distance between viewers and art. Digital media art promotes the viewer's thinking and artistic communication from the context, thereby generating a new artistic thinking for the viewer, which also reflects the artistic aesthetic effect of public participation. The creation of digital media art is not only an online display of works, but also a way for artists and viewers to communicate with each other.

The self-awareness participation in digital media art is different from traditional art appreciation methods. Traditional art appreciation also embodies the aesthetic realm of "forgetting both the object and the self", but it is only an appreciation of a work of art, and the viewer can only feel the value of the art work within the frame, and cannot achieve interaction with the art work. Digital media art can connect viewers with artwork creation, turning artwork appreciation into a process of artistic participation. In the appreciation of digital media art, viewers will exhibit a state of self loss, which will be maintained for a long time. This is also the design intention of art creators, allowing viewers to experience the feeling of entering reality in immersion.

Art is actually about showcasing reality. Traditional art places more emphasis on "realism", which can fully express the artist's true feelings in creating the work. And digital media art provides people with a "virtual reality" through various

technologies, thereby showcasing the "authenticity" and charm of art. Digital media art has its own unique participatory, transformative, and permeable nature. It is not limited by traditional framing rules and can achieve organic thinking integration. Through various methods, it can demonstrate the value of art to people, integrate art with life, connect modern art's "creative concept" with people's "daily life," achieve better communication between art and appreciation, and showcase the interactivity of digital media art, Enable the viewer to experience the feeling of "spiritual touch".

2.6 Related literature

The Value of Digital Media Interactive Art

What is the value of digital media art as a new category of art in building a harmonious society in the context of building a harmonious society and satisfying people's yearning for a better life and the The Internet Age? How can we build a harmonious society through art? The value and implementation path of digital media art in building a harmonious society are worth discussing.

1. A Brief Introduction to Digital Media Art and Design

Digital media art is a new art form based on the Internet and computers, utilizing technological means to integrate rational and emotional thinking. Unlike previous art forms, digital media art is a synthetic art that integrates multiple disciplines. Digital media art is the combination of art and contemporary cutting-edge science. Digital technology, biotechnology, quantum theory, economics, linguistics, and others can all become media for the realization of art. Roy Ascott, the pioneer of digital media art, said that the most distinctive characteristics of digital media art are connectivity and interaction. Understanding new media art creation requires five stages: connection, integration, interaction, transformation, and emergence. Firstly, it is necessary to connect and fully integrate into it (rather than just watching from a distance), interact with the system and others, which will lead to the transformation of the work and consciousness, and ultimately lead to the emergence of new images, relationships, thinking, and experiences .

2. The Value of Digital Media Art in Building a Harmonious Society

（1） Economic value

Digital media art, as an emerging art, possesses the emotional qualities of art. Artists can use inspiration to enter the imaginative world of art, which not only stimulates people's artistic aesthetics, but also enhances the commercial value of art. Commerce also puts higher demands on art. In building a harmonious society, economic requirements are the driving force behind the sustainable development of digital media art, as well as the driving force behind the stable development of society. From the traditional Industrial society to today's consumer society, the operation of social economy is actually based on the balance mechanism between production and consumption. Digital media art often becomes the direct driving force of consumption. Now many business activities are integrated with more and more digital media designs, which will bring greater economic benefits than traditional business models. For example, Guangzhou K11, a revolutionary museum retail concept and a hybrid model of art and commerce, has introduced many digital media art works and related artists, such as Olafur Eliasson, Teppei Kaneuji and Yinka Shonibare, which not only facilitates local and international art and cultural exchanges, but also promotes the economic benefits of K11 shopping center. In recent years, the country has implemented cultural tourism policies, and digital media art has also shown outstanding performance in cultural tourism night tours. For example, digital projection shows launched by major amusement parks, 3D projection programs launched by digital media cultural tourism towns, and tourist attractions. The rich and colorful forms of digital media art stimulate consumers' desire for consumption, and digital media art contributes its economic value without exception. As a part of the social economic cycle, digital media art must, on the one hand, comply with market laws and economic laws; On the one hand, it is necessary to continuously create economic value. In this sense, digital media art is also a productive force, playing an increasingly important role in promoting social harmony and economic development. (Art China | Time: 2006-03-23 17:31:19)

（2）Cultural values

There are many similarities between the cultural value of digital media art and the value brought by art itself, but there are also unique aspects. For example, digital media art works in public space, such as those with distinctive lighting festivals, Laser lighting display, interactive mechanical sculptures, etc. Artists integrate their

imagination and creativity into different spaces, and their unique artistic qualities permeate the entire creative space. The artist's consciousness endows different spaces with soul and vitality, appearing vibrant. High quality public spaces created through digital media art can promote rich and colorful spatial life, stimulate people's emotions and wisdom, and form a lasting impression of urban space through aesthetic identification and emotional memory. Taking the Guangzhou Tower - Xiaoman Waist as an example, the Guangzhou Tower during the day is a landmark building in Guangzhou. However, at night, the Guangzhou Tower has a digital media skin, and the external structure of Xiaoman Waist is covered with LED lights. The entire tower body is displayed through lighting changes and content, with colorful colors and rich visuals, making everyone feel as if they have entered a bizarre future world. The Guangzhou Tower - Xiaomanyao has now become an emotional symbol and cultural symbol of the city of Guangzhou. A distinctive urban culture has been formed, and the small waist covered by digital media art at night is even more eye-catching. In terms of the communication of traditional culture such as Intangible cultural heritage, digital media art also reflects its own advantages, making the audience of cultural communication wider in a more intimate and interesting way, and breaking through the restrictions of region, time and space. For example, traditional scenic spots such as Jimo Ancient City in Qingdao and Xidi Memorial Archway in Mount Huangshan rely on their own ancient buildings, and use modern photography technology to integrate artists' artistic content creation on their own scenic spot culture, so that the audience is refreshing. Digital media art has also become an important part of cultural communication and creation. Digital media art also plays a very important role in the cultural value of building a harmonious society and in the field of education. The traditional education method is relatively single and one-sided, and the classroom that integrates digital media art is more vivid and interesting. It can also increase the interactivity in teaching. Some schools have also developed digital media teaching aids to more effectively attract students' attention and make them concentrate. The school's exhibition halls and many museums are gradually integrating digital media art, reshaping the traditional museum experience, combining animated digital content with innovative technology, providing visitors with a new way to connect the past, present, and imagine the future.

（3） Aesthetic value

Joseph Beuys believes that everyone is an artist. This concept invites art down from the altar, making art daily and eventful. The single visual reception and information transmission methods of traditional art limit the dissemination of artistic ideas. It is the connectivity and interactivity of digital media art that drives the aesthetics of daily life, presenting it as an artistic and artistic life. In the traditional aesthetic judgment of "non utilitarian aesthetics", the connection between beauty and life is cut off. Digital media expands the degree and scope of aesthetic cognition, improves people's experience of beauty, or is in line with contemporary aesthetic creation. Art requires not only creative works, but more importantly, dissemination. Life oriented art is rapidly spreading through the rapid development of digital media art in daily life. Firstly, people are dizzy in their daily lives, and aesthetics has not only become their daily way of life, but also evolved into their ideological cognition of daily life. German philosopher Welch believes that Western society is undergoing a profound process of aestheticization, to the extent that the development of contemporary society is becoming more and more like a work of art. [4] We are undoubtedly experiencing a rapid expansion of aesthetics, and more and more realistic factors are enveloping aesthetics. Digital media art, in building a harmonious society, takes the aestheticization of daily life as a foothold, providing a reasonable explanation and explanation for cultural changes in the new era, and further refining the new aesthetic experience contained therein, making it condensed into the internal driving force of human spiritual development, It is also the theoretical gathering point of character literature and art culture in the new historical period. This is precisely an indispensable aspect of achieving a harmonious society, building a beautiful society, and fulfilling our ideal of a harmonious society. (Art China | Time: 2006-03-23 17:31:19)

3. The Implementation Path of Building a Harmonious Society through Digital Media Art and Design

（1） Strengthen innovation awareness and cultivate excellent digital media art talentsThe popularization of digital media art and design majors in major art colleges has laid a solid foundation for the development of the entire industry. Although digital media art started relatively late and is an emerging art form, it has a

interdisciplinary artistic perspective and can integrate different disciplines, media, and other fields, boldly exploring new experiences for new art forms. This requires students majoring in digital media art to have the courage to try interdisciplinary art and strengthen their innovation awareness. The introduction of excellent digital media art works from abroad has led to the vigorous development of digital media art in China in the short term. Various digital media art exhibitions are never interrupted. However, the large-scale introduction of foreign works will inevitably lead to insufficient innovation in domestic digital media art, and other institutions and enterprises with insufficient professional knowledge and ability will replicate foreign art forms in a large number, with monotonous content, It also makes people who enjoy digital media art feel aesthetic fatigue. The innovative exploration of digital media art, as well as its own vitality and creativity, should be the focus of development. The government should increase investment in the digital media art innovation industry, provide more policy support, and collaborate with major universities to promote the cultivation of digital media art talents, (Art China | Time: 2006-03-23 17:31:19) in order to output more excellent digital media art talents with strong innovative thinking ability to society.

（2） The industrialization of digital media art drives domestic economic developmentAlthough digital media art works are popular, their technical aspects are actually very complex, especially interactive works, which rely on the use of computer software and the development of internet technology. The cost of some media materials for digital media art is also high, and without strong financial support, the threshold for engaging in digital media art is very high. This is also the reason why digital media art in China has not formed an industrial chain. In the future, digital media art should reduce the complexity of technology and modularize it, making it easier for the rapid development of the entire art. The term "Evening economy", which has become popular in recent years, reflects the new business form of our country. The policy encourages the appropriate extension of business hours, which has stimulated a new round of consumption upgrading potential of our country, which has also stimulated the demand for digital media art everywhere. At this time, it is a good time to promote the formation of an industrial chain of digital media art. Governments, enterprises, and universities should establish the cultivation of digital

media art industry, academia, and research talents, ultimately promoting the popularization of art.

(china art https://www.gwyoo.com/lunwen/jylw/ysjylw/202102/735757.html)

4. Conclusion

In short, achieving a harmonious society and building a beautiful society has always been a social ideal pursued by humanity. According to the new requirements of China's economic and social development at the current stage and the new trends emerging in our society. The artistic characteristics of digital media art itself have played a strong driving role in the comprehensive construction of a harmonious society, and digital media art has put forward higher requirements for the emergence and development of future art forms. It is necessary to better handle the harmonious relationship between people and life, between people and society and the environment in the process of artistic creation, and meet the people's longing for a better life. We need to use digital media art to beautify and create our lives, making art more immersive. Only through this subtle influence can we truly feel the value of digital media art.

Regional Culture and Public art of Digital Media Interactive Art

1. Development status

As the name card of the city, Public art plays an important role in shaping the unique character of the city. Public art has become one of the important ways to build contemporary urban multiculturalism and spread public information. As an indispensable visual art image in the city, Public art records the history of the city and contains the culture of the city. Its design should not only meet the needs of urban public cultural services, but also reflect the regional characteristics and historical culture of the city. Digital media breaks the traditional communication mode of single Public art, making the viewer become part of the work unconsciously and interact with it. Digital media, as the crystallization of art and technology, is a direct way of information dissemination and is active in the field of public services. In the UK, the output value of the digital media industry accounts for approximately 7.9% of GDP, making it the largest industry; In Japan, electronic games, animation and cartoon, online games and other industries have become the second largest industry after the automobile industry. The domestic digital media industry is also developing rapidly.

In recent years, the integration of digital media technology and Public art design is more common. Digital media has a public and human touch, not only spreading diverse symbols, but also providing sensitive feedback and quick adjustment, which has a positive impact on consumer behavior.

(zhihu https://zhuanlan.zhihu.com/p/93238981)

2. Significance of digital media integration into Public art

In the design of urban Public art, it is increasingly combined with modern digital media arts such as film and television advertising, 3D animation, online games, online art, digital music, and has achieved good results.

2.1 Highlighting Publicity

Digital media is involved in Public art design. Based on video art, audio art, coding art, interactive art, network art and other means, it ingeniously combines art and technology to produce a new dynamic art form of expression, which enriches the connotation of Public art. In the design of Public art in the city square, the use of the unique communication mode of digital media art is conducive to the creation of the square atmosphere, tends to be popular, has affinity, enhances the communication and interaction between public works of art and the audience, and highlights the public nature of Public art. The Crown Fountain in Millennium Park in Chicago is a typical example of the perfect integration of digital media and Public art. The designer skillfully integrates media art into Public art, and sets the background of the fountain as a multimedia screen. The multimedia display screen controlled by the computer alternately plays the smiling faces of 1000 citizens representing Chicago, welcoming tourists from all over the world. Every once in a while, water spouts from citizens' mouths on the multimedia screen, bringing surprises to the audience, strengthening the interaction between the media Public art and the audience, and highlighting the publicity.

2.2 Enhance interactivity

The integration of digital media into Public art design enriches the manifestation of Public art and creates online virtual space for the public. With the intervention of digital technology, people can communicate more conveniently and interact more interactively. The "National Memorial Network" built to commemorate the victims of the Nanjing Massacre is a good example. Netizens can light candles

and lay flowers for their deceased compatriots through online media to express their condolences to the deceased. The design colors of the "National Public Sacrifice Network" are mainly blood red, black, and white, highlighting the theme of "national sacrifices, historical pain, and people's wishes". At present, the website has launched three versions in Chinese, English, and Japanese. The Chinese version is mainly divided into seven major sections: sacrificial information, overseas sacrificial offerings, online sacrificial offerings, sacrificial echoes, sacrificial education, sacrificial knowledge, and online historical data centers. The English version and the Japanese version are divided into four sections, namely, online public memorial, public memorial information, public memorial knowledge, and forum interaction. The application of media art not only provides a high-tech design platform for Public art design, but also enriches the forms of expression of Public art design.

2.3 Shaping a Beautiful Image of the City

As a dynamic art form, multimedia Public art usually interacts with the public in a dynamic form. By using dynamic media art techniques to integrate unique regional culture, natural environment, and modern urban temperament, urban individuality can be demonstrated and a beautiful image of the city can be created. In some European and American countries, Public art has developed into an important symbol of Urban culture. For example, the Arc de Triomphe and the Eiffel Tower in Paris, France not only vividly record the history of the city, but also reflect the unique regional culture of the city. For example, at the closing ceremony of the 2008 Beijing Olympics, planners used digital media art to present the national flags of various countries in the form of large electronic screens for dynamic dissemination, bringing a new visual experience to viewers.

3. Nanjing Public art Design

Nanjing is a famous historical and cultural city in China, known as the ancient capital of the Six Dynasties and the capital of the Ten Dynasties. The ancient culture, the culture of the Six Dynasties, the culture of the Ming Dynasty, the culture of the Qing Dynasty (Taiping Heavenly Kingdom) and the culture of the Republic of China complement each other. The long history has left Nanjing with rich cultural heritage and laid a unique cultural foundation. At present, there are few Public art designs that can truly reflect the characteristics of urban regional culture and meet the needs of

public cultural services. Most of the design of Public art in Nanjing is not integrated with digital media art, and the form is single, which cannot leave a deep impression on the audience. If Public art design wants to reflect the unique aesthetic value of a city, it should strengthen the integration with digital media technology.

3.1 Application of digital media in Public art design in Nanjing

Digital media technology takes "intelligence" as its main feature, and combines print media, network interaction, film and television animation and other forms to diversify the manifestations of Public art. At the 2014 Nanjing Youth Olympic Games, a large number of digital media technologies were adopted, which enabled Nanjing to demonstrate world-class level in modern design of public spaces such as traffic diversion, safety assurance, leisure shopping, tourism accommodation, cultural and sports venue construction, leaving a good impression on tourists from all over the world. Most bus stops in Nanjing are equipped with multimedia electronic screens displaying the words "How many stops are there for XX bus from this station. Waiters can clearly understand the waiting time based on the prompts on the screen.

3.2 Countermeasures for digital media involvement in Public art

3.2.1 Replacing Traditional Media with Video and Audio

The use of new media such as video and audio can better reflect the regional culture of a city and shape its beautiful image. A multimedia large screen can be set up in the central area of Nanjing City to alternately play Nanjing's culture, history, entertainment, and cuisine. In the display windows of urban bus stops, digital media can be combined to alternately display two advertisements, replacing static and single traditional advertisements with multimedia dynamic advertisements. In addition, MP3 players can be set up next to the platform to play different music works according to people's different needs.

3.2.2 WIFI fully covers urban centers

Within three years, we will achieve full coverage of wireless broadband in the city center and accelerate the construction of digital urban network systems. With the intervention of digital media technology, people can use wireless network technology to interact and communicate with others anytime and anywhere. Combining digital media technology with online interactive art, WIFI provides mobile location guided tours to tourists. The public can use the wireless network to

interact with art, participate in online questionnaires, timely feedback information, interact with others, and interact with public art.

4. Conclusion

In the digital information age, Public art design should strengthen the integration with digital media technology. The integration of digital media and Public art is conducive to enhancing the interest of the urban environment and enhancing the communication and interaction between Public art and the public. This interaction is not limited by time and space, and can better reflect the culture of the city, enhance its quality, highlight its personality, and shape a beautiful image of the city.

Research on Digital Media Teaching Issues

Stereoscopic teaching digital media art is an emerging art form that combines modern technology and traditional art, and is an important component of the digital economy. It is of great significance for building a digital China and promoting high-quality and efficient economic growth. However, due to the fact that the digital media art major is an emerging profession and the teaching mode is not yet perfect, there are still imperfections in the current talent cultivation mode of the digital media art major in China, which cannot meet the market's requirements for talents.

1. The Shortcomings of the Current Talent Training Model for Digital Media Art Majors

（1） It is difficult to fully mobilize students' enthusiasm. Some courses in digital media art majors are relatively rigid, making it difficult to fully stimulate students' learning enthusiasm. （2） Teachers' teaching does not cater to students' professional characteristics. Some teachers do not understand the characteristics of students majoring in digital media art, and their teaching does not match the characteristics of students majoring in digital media art who are good at emotional thinking and enjoy hands-on activities. They cannot effectively cultivate students' comprehensive abilities such as humanistic literacy, artistic cultivation, and aesthetic ability. （3） Lack of effective teaching practices. Some digital media art majors have limited practical approaches and cannot effectively guarantee students' full practical learning, resulting in their ability and quality not fully adapting to the development of the digital era and information society, and their perspectives and

communication abilities are limited. Therefore, how to establish a talent cultivation system suitable for the characteristics of digital media art students in undergraduate colleges has become a top priority.

    2. The Rise and Shortcomings of Flipped classroom and Micro class

    （1） The rise of Flipped classroom and micro class. Flipped classroom and micro class originated in the United States. Jon Bergmann and Aaron Sahms, chemistry teachers of Woodland Park High School in Rocky Mountain, Colorado, recorded and uploaded the teaching content to the Internet for students to learn by themselves, which was widely welcomed. With the progress of information technology, this new teaching mode has been further developed and popularized worldwide. Many domestic colleges and universities have carried out extensive practice and application of Flipped classroom and micro class as an effective way to combine information technology with teaching. Many domestic experts and scholars have carried out a series of studies on the concept of Flipped classroom and micro class, its application in China, and its impact on related courses, and have achieved remarkable research results. For the effectiveness of Flipped classroom and micro class, according to the research of Li Tongtong, Pang Li and Wang Zhijun, it has a moderate positive impact on enhancing students' learning effect. According to the research by Yu Shuyun and Liu Jianqiang, over 70% of learners believe that it can improve learning efficiency and enhance learning interest. （2） The deficiency of traditional Flipped classroom and micro class teaching mode. However, the traditional Flipped classroom and micro class itself also have some shortcomings. One is that it has not yet shaken off the influence of traditional teaching models. This model still does not break away from the traditional model of "teaching" by teachers and "learning" by students. It is still teacher centered and mainly focused on teaching, and cannot fully achieve the interaction between teaching and learning. It is inevitable that students cannot consciously complete their learning online and do not actively participate in learning discussions offline, making it difficult for teachers to provide timely assistance. Second, it is difficult to guarantee the quality and quantity of micro courseware. Due to the fact that most teachers are not technical personnel, the quality of video production is difficult to guarantee. Moreover, the production of micro courses mainly relies on the production of one or several teachers. Due to limited

energy and ability, the production resources are limited, and the micro course courseware is not rich enough. Thirdly, it can only be applied to a single course. The traditional Flipped classroom and micro class are mainly aimed at a certain course or a certain knowledge point, instead of considering all professional courses of students as a whole. Fourthly, there is a lack of targeted application in the teaching of digital media art majors. The previous Flipped classroom and micro class teaching did not meet the uniqueness of digital media art majors, and could not effectively give play to the professional expertise of digital media art majors.

3. Three dimensional interactive teaching model of Flipped classroom and micro class for digital media art majors

In view of the above problems, the author tries to give full play to the professional expertise of digital media art majors in micro course production. Through the reform practice of three-dimensional interaction between teaching and learning of flipped courses and micro courses, the author explores Flipped classroom and micro course teaching in the teaching of digital media art majors, and on this basis, establishes a three-dimensional interaction teaching model of Flipped classroom and micro courses with three subjects, three periods, three chains, and one center. （1） Construct three teaching subjects. In previous teaching models, there were two main bodies: teaching and learning. The main body of "teaching" was the teacher, while the main body of "learning" was the students. The author attempts to decompose and reconstruct the identity of students majoring in digital media art, endowing them with the identity of "teaching" in addition to the identity of "learning". Of course, these two identities cannot be matched to a student in the same grade at the same time, but are relatively separated and assumed by two subjects, namely, the senior students assume the identity of "teaching" and the junior students assume the identity of "learning", thus constructing three teaching subjects: senior students, junior students, and teachers. （2） Construct three teaching periods. According to the general mode of Flipped classroom, we focus on constructing three teaching periods of Flipped classroom and micro class teaching for digital media art majors: the first stage is the pre class stage, where students make and study micro classes in combination with digital media, and do a good job of preparing for the course; The second stage is the in class stage, where three teaching subjects interact to carry out classroom teaching;

The third period is the after-school stage, where three teaching subjects evaluate the learning effectiveness and provide assessment scores. （3） Construct three teaching chains. Construct three chains by stringing together the hierarchical relationships of each grade from freshman to senior in the digital media art major during three teaching periods. The first chain is to construct a micro lesson production chain in the pre class stage, where senior students produce micro courseware for junior students, junior students produce micro courseware for sophomore students, and sophomore students produce micro courseware for freshman students; The second chain is to construct a guidance chain during the in class stage, similar to the first chain, where older students guide lower grade students' classroom learning during the in class stage; The third chain is to construct a scoring chain in the post class stage, which is divided into two directions. One direction is for senior students to rate the classroom learning situation of junior students, and the other direction is for junior students to rate the quality of micro courseware production for senior students. After the conditions are ripe, the three chains can be timely improved into three closed loops, namely adding micro course production, in class guidance, and after class grading (including micro course quality grading from senior to senior) in the three chains, and constructing micro course closed-loop, guidance closed-loop, and grading closed-loop connected to the beginning and end of the four grades. The grading closed-loop is also divided into two directions. （4） Construct a teaching center. In this teaching model, there is a strong emphasis on students' self-learning and step-by-step guidance, highlighting their dominant position in "teaching" and "learning". Only by building a teaching system with teachers as the center, can we ensure the smooth operation of Flipped classroom and micro class three-dimensional interactive teaching mode for digital media art majors.

4. The significance of the three-dimensional interactive teaching model of Flipped classroom and micro class for digital media art majors

（1） It can effectively enhance students' learning enthusiasm and initiative. By changing students' pure "learning" status in teaching and endowing them with a new positioning of "teaching" on the basis of "learning", and through the transformation of identity, students realize that they are not only a learner of

knowledge, but also a imparter of knowledge, thus establishing their goal of "learning" and "teaching", as well as their enthusiasm, initiative, and responsibility to strive for learning. （2） Be able to combine courseware production with the practice of professional skills. The production of micro course courseware requires the application of professional knowledge and skills in digital media art, which can fully leverage the professional characteristics of digital media art students in image thinking and practical operation, and leverage their professional expertise in animation production, layout design, video editing, and other aspects. Through this learning and practical platform, the artistic cultivation and aesthetic ability of digital media art students can be effectively exercised, Broaden your horizons and cultivate good communication skills. （3） To maximize the teaching role of teachers. In the three-dimensional interactive teaching model, teachers are no longer just educators, but also organizers, coordinators, implementers, guides, and evaluators. The overlap of multiple identities requires teachers to continuously tap into their own potential and improve their professional qualities in order to better adapt to the three-dimensional interactive teaching mode. （4） Able to achieve overall linkage of course learning. In this mode, the curriculum of each grade from freshman to senior is no longer isolated, but a curriculum chain connected by Flipped classroom and micro class. From freshman to senior, the curriculum learning, classroom interaction, and after class scoring are closely linked, one by one. This urges students to maintain a high level of focus throughout, thereby promoting enhanced learning outcomes. （5） It can greatly enrich teaching resources. Due to the participation of all students in the production of micro course courseware, it can greatly enrich the form, content, and sources of micro course courseware, and form a pool of micro course courseware for teachers and students to choose their best or learn according to their personal interests.

Visual development platform TouchDesigner

TouchDesigner for Mac is suitable for visual development platforms on the macOS platform. Whether you are creating interactive media systems, architecture prediction, live music visual effects, or rapid prototyping, TouchDesigner Mac provides you with the latest inspiration and creative ideas.TouchDesigner for Mac (prototype design rendering software) mac.orsoon. com/Mac/154607. html

TouchDesigner is a visual development platform that provides you with the tools you need to create excellent real-time projects and rich user experiences. Whether you are creating interactive media systems, architectural projections, live music visual effects, or just quickly creating prototypes of the latest creative impulses, TouchDesigner is a platform that can be achieved. TouchDesigner for Mac (prototype design rendering software) TouchDesigner is a visual development platform that provides you with the tools you need to create excellent real-time projects and rich user experiences. Whether you are creating interactive media systems, architectural projections, live music visual effects, or just quickly creating prototypes of the latest creative impulses, TouchDesigner is a platform that can be achieved.

(1) TouchDesigner Mac Features Introduction

Projector mapping

Projection mapping involves customized solutions for each job, and no two projection settings are the same. The functionality and customization options suite of TouchDesigner ensure that any projection project can be carried out.

TouchDesigner's open platform provides multiple solutions to address this task. Large and small projects can be handled in various ways to adapt to different scenarios and budgets encountered in projection mapping. Contains a projection tool set that can help you get started quickly. Starting from the basic knowledge of adjusting the output, the "Stoner" tool can meet the mesh deformation needs of all trapezoidal distortions and mesh types. This tool, along with the "ProjectorBlend" tool used to handle projector fusion, can alleviate the initial hassle of projector setup.

(2) Application construction

TouchDesigner allows for building application engines and user interfaces in an integrated environment. From simple functional prototypes to complete polishing applications, you can create anything.Most applications require technology or user oriented interfaces to control the system. The extensive set of control panel features allows for customization of the interface and logic. Design the front-end UI to have any desired appearance or functionality. Support various interactions, such as mouse or touch screen based control panels, 3D virtual environment control, gesture input, and multiplayer interaction.

(3) Interoperability

TouchDesigner collaborates closely with the world around it. Whether it's other software, protocols, hardware devices, or the Web, TouchDesigner can be integrated into any environment through a wide range of interoperability options.

Interoperable with Ableton Live, Max/MSP, Substance Designer, Notch, vvvv, OpenFrameworks, Resolve, web applications, etc.

Collaborate and integrate TouchDesigner as an element of a larger creative channel. Create interactive works with minimal or almost no code using native support for the latest hardware devices such as Kinect Azure, Realsense, ZED, Vive, Oculus, laser controllers, LIDAR, and multi touch screens.

Activate bidirectional communication protocols for videos, sensors, devices, and data using NDI, OSC, DMA, ArtNet, Dante, TUIO, MQTT, Siphon/Spout, SocketiO, FBX, USD, etc.

C++programmers can create their own operators, visual effects, and integrate external SDKs. With the help of Nvidia graphics cards, people can also use CUDA for GPU acceleration simulation, particle, physical effects, and more. The coloring in TouchDesigner uses the GLSL coloring language. Write your own pixel, vertex, geometric, and computational shaders for 2D textures and 3D materials. For 099, the default version has been updated to GLSL 3.3.

(4) Real time 3D and synthesis

The combination of real-time 3D rendering and high-resolution real-time synthesis creates a pixel motion field, allowing you to discover new ways of content creation. TouchDesigner's 3D engine uses its Surface Operators series for process geometry modeling. Or import geometry in FBX or USD format, while also supporting import, animation, cameras, textures, etc. In addition, utilizing the GPU in the system to manipulate and transform thousands of geometry instances, all of which have interactive control and real-time performance.PBR materials (physics based rendering) and ambient light provide TouchDesigner with new levels of rendering quality. Local support for material designer materials, with access to a large community of material designers and hundreds of available materials. If deep customization is required, GLSL shaders and materials or C++effects can be incorporated into the mix at any stage.

(5) High performance media system

TouchDesigner is the highest performing video playback software available today. It allows you to play more movies at higher resolutions or frame rates to maximize the potential of your hardware.

Use advanced codecs such as HAP Q, Cineform, H.264, and H.265/HEVC for high-performance video playback. The resolution is only limited by GPU hardware, with most GPUs allowing 16K resolution, while newer GPUs allow 32K resolution. High frame rate 4K 120Hz playback and a large number of simultaneous movies are only limited by hardware. Built in tools can manage and configure display layouts, ranging from a single 1080p output to large multi screen and multi machine canvases. Use synchronization operators and hardware framework locking to create large multi machine networking infrastructure.TouchDesigner is a software that combines real-time 3D rendering with high-resolution real-time synthesis. This software creates a pixel motion field for everyone, allowing you to discover new ways to create content. TouchDesigner can import geometry in FBX or USD format, and also supports importing, animations, cameras, textures, and more. In addition, utilizing the GPU in the system to manipulate and transform thousands of geometry instances, all of which have interactive control and real-time performance.
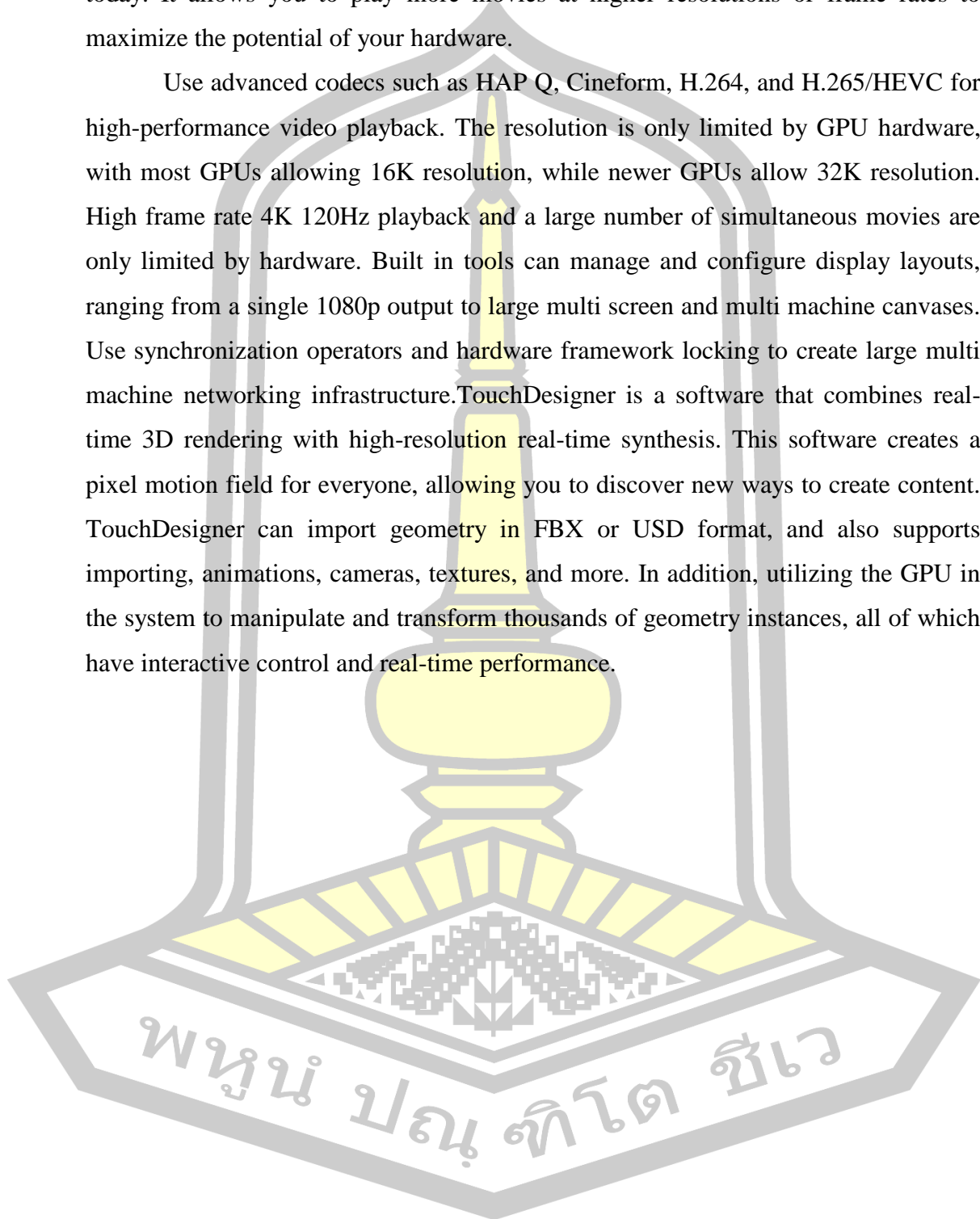
CHAPTER III

Scope of the study

3.1 Research Topics

3.1.1 How to get rid of the "fast food" of media artworks. China's new media art started in the late 1980s and went abroad to enter the international stage after the 1990s. Since entering China, new media art has gradually got rid of the shackles and influence of Western new media art, experienced a process from deconstruction to construction, artists from the practice method to the practical application of exploration and advancement, from still images to dynamic vision, from single interaction to the combination of sound and light, the form of artistic expression continues to iterate and change, during this period with economic recovery and network development, media interaction art also shows the "fast food" style of works and thinking, under the technical bottleneck media interaction art is full of plagiarism and low nutrition, More and more people put visual effects first, losing the way they think in the process of painting on the shelf.

3.1.2 The impact of different stages of the development of Chinese media art on society. The Canadian scholar McLuhan's "media as information" theory is highly summarized in communication The status and role of the media in the development of human society. In his view, "it is precisely the formal characteristics of the media that constitute the historical behavioral efficacy of the media." The evolution of the historical process proves the forward-looking and pioneering nature of the theory of "technological determinism" represented by Innes and McLuhan. Since China entered the industrialized society, the media such as newspapers, radio, and television have had a far-reaching two-way impact on the social life of the masses of the people. The development of media in the 21st century is moving towards the track of interactive integration under the leadership of Internet technology, and the development of emerging technologies such as VR technology has brought different impacts to people's lives.

3.1.3 What is the practical significance of creating through touch designer integration interaction platform. In the process of creation, people choose more and

more carriers, during which there is no shortage of various platforms, such as Unity, processing, microcontrollers, Touch Designer, etc., of which the use of Touch Designer is gradually widely and accepted, which can be seen as a platform for the integration of a variety of practical methods, which has a certain degree of convenience and acceptance in learning and application, and more and more professional colleges and universities have also opened related courses The study of Touch Designer's visual language and application is conducive to the development needs of experimental art and media art, and helps to find its own suitable position and develop its own nationalized visual works in the corresponding time nodes of the development of media art.

3.2 Study Period

The study is planned to be conducted in April 2022 and data collection will be conducted from April to June 2022.

Conduct data analysis from June to July, conduct theoretical research and writing (organizing the structure and outline of the paper) from July to October, and gradually revise and adjust the content in October

3.3 Research Methodology

3.3.1 Literature analysis method, study relevant literature at home and abroad, sort out the background of the development of video art and related theoretical research results, and provide inspiration and reference for this paper.

3.3.2 Comparative method, through comparative analysis of the characteristics of different stages of digital images, traditional images and digital images, to find out the law of the existence and development of image art.

3.3.3 Case analysis method, using the method of combining comparative analysis and typical argumentation, combining theory and practice, and using typical cases for specific analysis to better analyze and understand the application cases and prospects of TOUCH DESIGNER.

3.3.4 Inductive reasoning methods, by summarizing the existing and development laws of digital images in the past and present contexts, infer and predict

the ongoing, upcoming and future conceptual evolution, creative methods and art forms.

3.4 Research Areas

From the perspective of three-dimensional space-time, the research field of this paper is the domestic image media art on the timeline. From an abstract conceptual point of view, the field of study of this paper is the theoretical study of digital media. From a regional perspective, the research areas of this paper include Beijing, Shanghai, Guangzhou and other media-developed areas in China and areas touched by new trends in art.

3.5 Population and Sample

Population: Study the target audience and application group of Touch Designer, and classify them according to different social professions. They include: Modern and Contemporary Chinese Media Artists and Works, History of The Development of Chinese Media Art, China's Largest Interactive Community, Shanghai TEA Community, Digital Fun Studio, The Latest Interactive Works Cases The sample represents a subset of members that a group needs to study, which can be roughly divided into three categories: Touch Designer artists, digital media majors, and business professionals applying Touch Designer.

3.5.1 Key Informants, about 10 people.

Key Informants are professional artists who apply TD. Through interviews with these individuals, we can understand the current application status and profound artistic concepts of TD, and gain a deeper understanding of TD in the field of art.

3.5.2 Casual Informants, approximately 15 people.

Casual Informants are students who use TD for creation and application. By conducting research on this group, they can directly understand the current application status of TD in the teaching field and observe the problems reflected. Students are the most direct participants in teaching and provide the most direct feedback.

3.5.3 General Informants, approximately 5 people.

General Informants are individuals who apply TD in the business field. Through interviews and observations with these individuals, one can understand the

practical value and development prospects of TD in society. Through research on this group, one can intuitively understand and judge the prospects of TD in society.

3.6 Research process

From June to July 2022, I visited China's largest and most authoritative new media interactive art agency, Tea Community and Digital Fun Media Art Studio, which recently undertook the immersive exhibition hall | "Talking Garden", "Green Water and Green Mountains" - the fusion of traditional culture and new art. as well as the display design work of the new generation Land Rover Range Rover launch conference. The two projects, which take on the latest interactive contemporary and immersive exhibition modes respectively, to give people a refreshing viewing experience, the studio has been committed to media interactive artworks and commercial works, which is the benchmark in the industry. The tea community is mainly committed to the social education and training of touch designers, which will regularly open interaction design courses with td as the main body, for all groups in society, even people with zero foundation can learn. At the same time as the inspection, I also participated in the registration of the software course, and experience and discussion, the course mode is easy to accept, and can make a certain effect of the work, can open up creative ideas for users and enhance the media aesthetic awareness. The Tea community and digital fun are two parallel and independent working groups that focus on Shanghai and face the whole of China, attracting and cultivating media workers who are interested in td for the society. During the survey, the interviewees for the next survey were also identified, which can be conducted as a formal interview, he is the Asia Chairman of the TEA Community, Chen Ruokun, the media artist Frank, the td course teacher, Sky Feng, and the relevant personnel of the Digital Fun Art Studio, and the interview questions are being sorted out according to the progress of their research.

3.7 Research Tools

3.7.1 Literature research Tools. The literature research method is one of the most common research methods in sociological philosophy. By studying TD related literature, new conclusions, perspectives, and existing problems can be drawn.

Studying TD related literature can inspire previous research and reduce blindness. At the same time, the viewpoints of predecessors can be used as evidence to enhance the persuasiveness of research. To study the development of TD in China, it is necessary to sort out relevant node information through historical literature. In the history of digital media in China, what changes have been brought about by the emergence of TD culture. The literature in this article mainly comes from (1) the Chinese University Database, which can access all relevant papers in the field of universities. It is a huge database of reference and citation for Chinese university papers, with rigorous and accurate characteristics. (2) Self media journals in China are online documents pushed through online and mobile platforms. Their advantage lies in their ability to quickly understand the current development of media art. They have the characteristic of convenience in research, as well as the emergence and proposal of new concepts. (3) Google Academic is a literature search website that is similar to domestic university data platforms and mainly provides literature search services. It can be used to integrate research with international related content. (4) Bibliographic retrieval of literature enables the purchase and retrieval of paper-based reading materials, many of which can fill the gaps in online information.

3.7.2 Survey questionnaire Tools, Structured interviews. The purpose of structured interviews is to access and obtain the necessary materials for the research through interviews. The interviewees in this study include new media artists, scholars, students, and relevant practitioners, including different age groups and social divisions. This study uses structured interviews and questionnaires to ask and answer relevant questions, and designs questions and conducts targeted personnel interviews, To achieve the accuracy of information collection, interviews need to be conducted in a careful and rational manner with regularity.

3.7.3 Observation Table Tools, Non participatory observation methods. Non participatory observation is a method of observing research objects under natural conditions and an important component of research cases. Through on-site research in art museums, art universities, galleries, artist studios, commercial spaces, etc., relevant information about TD can be intuitively collected. This method can better maintain the independent judgment of researchers, be unaffected by environmental and human factors, and be easier to make accurate evaluations.

3.7.4 Research summary: In the early stages of this study, literature research methods were mostly used. Knowledge and theories related to TD were searched through online and offline literature searches, and relevant research results were analyzed as references. The types of data collected were divided into (1) historical literature on digital media art, (2) historical events of digital media art, (3) relevant news, (4) research on related works, and (5) interview data, recordings, images, and video materials.

3.8 Data collection

3.8.1 Consult relevant domestic historical documents, relevant university libraries to find, The collection of this information is mainly carried out using table recording tools, and the collected objects are used as references.

3.8.2 Consult relevant theoretical books. The main purpose of collecting this information is to supplement relevant information.

3.8.3 Interviews with relevant artists. The collection of this information was conducted using an interview questionnaire tool, with Key Informants as the main reference for the study.

3.8.4 Interviewing students from relevant schools, the main body of this information collection is Casual Informants, which can provide a better understanding of the current use of Touch Designer.

3.8.5 Use observation tools to collect information on Touch Designer works and related art field works.

3.9 Organize and analyze data

Classified as: The first step of data collection is to collect and analyze data on the development history of Chinese digital media art and Touch designer. The second step is to collect information about the relevant population, including interviews and questionnaire surveys. The third step is to collect relevant works using observation methods. The fourth step is to discuss and analyze the collected data, and draw relevant conclusions.

3.10 Information Presentation

3.10.1 Historical Documents

3.10.2 Table

3.10.3 Case Pictures

The survey field is shanghai, due to the epidemic situation, the survey site has now been closed for one month, and some information can only be obtained through the network.

1) Historical documents: 《The Concept of Human-Computer Interaction》《The Implementation and Influence of Interactive Art》《History of The Development of Chinese Images》《Visual Machine》《Application of Digital Language》《Media Communication》《Chinese New Media Art》

2) Table: What is Touch designer：

TouchDesigner (TD) is a commercial multimedia special effects interaction software developed by canadian company Derivative. is a very friendly creative programming tool for designers or visual creators, mainly used for real-time interactive new media creation.

TouchDesigner is different from other programming software, it provides a node-based visual programming environment, allowing us to easily produce works without typing code, just through the wire.

What Touch designer can do: image interaction, 3D light projection, vj performance, visual interaction, abstract art.

China's largest Touch designer community: Shanghai TEA Community

Components of TEA:

TEA's personnel: Staff: Teachers:

TEA's interactive project:

Digital fun studios owned by TEA are responsible for content:

Digital fun studio project:

TEA customer base:

Informal Interviews:

International impact:

Domestic impact:

CHAPTER IV

Result

Chapter 4 explores how studying Touch Designer and its teaching methods can help correct the issues raised in the current context of digital media in China. Studying the visual language and application of Touch Designer, as well as addressing these issues, can contribute to the development needs of experimental art and media art, It helps new media artists find their suitable position and create excellent visual works that meet the requirements of the times in the corresponding time nodes of media art development. To study Touch Designer, it is necessary to sort out the development context of visual language and culture in China, as well as to study the cultural value and significance of artistic creation through the TouchDesigner interactive platform in the current era. To study and analyze its existing problems, and to design a teaching solution in Touch Designer teaching, this chapter proposes three research objectives:

1. Study the history of TouchDesigner and the development of digital media art in China.

2. Study the current application status and problems of TouchDesigner in China.

3. The creative method of TouchDesigner in contemporary art creation.

4.1 Study the history of TouchDesigner and the development of digital media art in China

The Development History of Touch Designer

This chapter mainly aims to organize the development process of TouchDesigner. Tracing the development process of a tool based software, in addition to sorting out the technology behind this tool, it is also more about obtaining the answer "why was this tool born.Why do people need tools like TouchDesigner to design and create real-time interactive multimedia content? American philosophy professor Alva Noe wrote in his book "Strange Tools: Art and Humanity," that "technology organized us and thus made us human like us." Perhaps from the birth

and subsequent development of TouchDesigner, we can see the increasing demand for certain digital content in human life; And the constantly changing relationship between us and these digital content.The information in this article mainly comes from the official documents of Derivative Company, Wikipedia, and some fragmented online materials. The information links are marked in the article.

(1) Omnibus and PRISMAS

According to the documents of Derivative, a subsidiary of TouchDesigner (hereinafter referred to as TD), the origin of TD can be traced back to Omnibus Computer Graphics (hereinafter referred to as Omnibus CG), which was established in Toronto in 1982 and is part of the Omnibus Group. According to People Behind The Pixels, a computer graphics history website, Omnibus initially engaged in marketing and communication business, but later developed into the video industry. In the 1970s, it founded Image West in Hollywood, specializing in analog video production. Since then, Omnibus' video business has flourished and entered the increasingly popular computer graphics industry.In 1986, Omnibus successively acquired Digital Productions and Robert Abel&Associates Inc., the two largest computer graphics companies in North America at the time. Omnibus has participated in the production of many classic science fiction films, such as the 1986 film 'Flight of the Navigator'. The strength of Omnibus in the computer graphics industry is evident.But this monopolistic operation seemed too hasty at the time, and after Ominibus's fierce momentum, it was actually full of crises. The Canadian magazine "Graphic Exchange" once published an article introducing the evolution of Omnibus's business landscape. Although Omnibus's main founder, John Pennie, had a keen intuition about the computer graphics industry, due to excessive borrowing, Omnibus declared bankruptcy in 1987.The dream of owning a huge commercial empire was shattered, and Omnibus became a fleeting phenomenon in the history of the computer graphics industry. However, within just 5 years of Omnibus CG's development, Developed a product that is crucial for today's computer graphics industry - Prism (PRISMS, of course "prism" is a software, and for some reason, Americans are very fond of this term) . After bankruptcy, Omnibus sold PRISMS to its former employees Kim Davidson and Greg Hermanovich, who founded the renowned Side Effects Software, also known as SideFX, in 1987 and held a leading position in the film and

television special effects industry.Houdini, a subsidiary of SideFX, pioneered the use of programmed node editing and powerful 3D animation implementation in computer graphics, all of which can be found in PRISMS. From early software images, it can be seen that PRISMS already has nodes designed for programmatic processing and various editor modules in its user interface. PRISMS's powerful capabilities in 3D computer animation visual effects were almost unbeatable in the market at that time, and later developers improved its functionality for more complex visual development scenarios, which were widely used in the film industry before the new century. Until the first version of Houdini was released in 1995-1996, PRISMS still had a place in the visual effects market at that time.

But what does all this have to do with TouchDesigner? If you have experience using both TD and Houdini at the same time, you will find that the underlying logic of the two is really similar, and the classification of components is almost consistent. However, Houdini has more complete functions and more complex implementations. And Houdini is not as capable of generating real-time images as TD, let alone considering the interactive functionality of images. In fact, the design of TouchDesigner, like Houdini, is "taught from the same field", originating from PRISMS in the 1980s. Greg Hermanovich, one of the founders of Side Effects, was also the founder of TouchDesigner's company, Derivative.

(2) Derivative and Houdini 4.1

Houdini 4.0 was released in July 2000, which was the same year that Greg Hermanovic left SideFX to establish Derivative Company and designed the prototype of the first generation TouchDesigner based on Houdini 4.1. It can be said that "TouchDesigner is the son of Houdini".

Houdini 4.0 is estimated to have been used in the current CG industry as a legitimate "OG". The 4.0 version is definitely one of the most groundbreaking versions in the growth history of this software. According to a 2000 review article in Computer Graphics World magazine, Houdini 4.0 already has multiple components (operators), including SOPs (surface operators), POPs (particle operators), CHOPs (channel operators), SHOPs (shadow operators), COPs (compositing operators), and TOPs (texture operators). The grouping of components 20 years ago has hardly

undergone significant changes today. One of the essence of Houdini, VEX scripting, is also a new feature added in version 4.0.

Returning to TouchDesigner, it may be based on the source code of Houdini 4.0, which is very close to Houdini 4.0 in terms of appearance interface and operational logic. On the occasion of the 20th anniversary of touchDesigner's birth in 2020, Derivative officially released a review article describing the development process of this software. TouchDesigner began designing in 2000 and welcomed its first official release version, TouchDesigner007, in 2002.

Derivative's positioning of its own software functionality is vastly different from SideFX, with real-time and interactive features being the core DNA of TouchDesigner. TouchDesigner has been widely favored by VJs since its launch, along with TouchPlayer and TouchMixer. This series of tools initially had a relatively fixed user base and a very active community.

After 2002, the update iteration of TouchDesigner entered a period of rapid growth. The 007 version released in 2002 had already iterated to the 017 version by 2005, and TouchDesigner continued to update and iterate until the release of the new generation TouchDesigner 077 in 2008. It is worth mentioning that currently, the official website can still download version 017, and all functions are free (although it feels useless). In its initial development phase, Derivative officially released a CD called TouchArt, which contains original files of various art works created using early versions of TouchDesigner. Perhaps it was in order to continue reading the files on this CD that I kept the 017 version of TouchDesigner, but now it's difficult to find this CD.From the above development process, it can be seen that the birth of TouchDesigner can be traced back to the blue ocean created by computer graphics in the film and television industry. However, it seems that it has not positioned itself as a tool for creating digital film and television content, but rather has taken the lead and focused on real-time interactive imaging, grasping the VJ and stage art industries that require real-time interactive imaging from the beginning. However, after a basic understanding of the current TouchDesigner, it can be found that its functions have expanded to a wider range - virtual reality, 3D projection, lighting design, playback control systems, and other aspects have made achievements, no longer limited to VJ or stage art.

So what are the significant changes in TouchDesigner after 017? Before exploring this issue, let's insert some introductions about Greg Hermanovic, the founder of Derivative.

(3) Greg Hermanovic and his people

Greg Hermanovic is a legendary figure in the field of computer graphics. In 2003, he was awarded the Science and Engineering Award by the Academy of Motion Pictures Sciences and Arts in recognition of his pioneering programmatic modeling in the film industry. From the 1970s to the early 1980s, he had 6 years of experience in developing space flight simulators. In the 1980s, he served as the head of computer graphics research and development at Omnibus Computer Graphics, and later co founded Side Effects Software with other big shots. Today, Greg Hermanovic is the president and CTO of Derivative. In short, Hermanovic's career is very hardcore and he is a leading figure in this field. And from online information, Hermanovic has always been a person who loves technology research, innovation, and sharing. There are many posts on the Derivative official website where he answers questions for others or some of his public workshops.

(4) TouchDesigner Historical Version

TouchDesigner 077

The 077 version was released in 2008, which has undergone significant changes compared to the 017 version. According to the download version provided on the official website (FTE. 18900), the image quality of the software itself is relatively low. In addition, there are also significant differences in appearance compared to the current version (the difference of "at first glance, upon closer inspection, something is wrong"). The 077 version uses OpenGL for the first time to systematically build the entire software, which has improved rendering quality. At present, many features of the 077 version are still in the embryonic stage, for example, the Instance function can only provide instantiation data through CHOP. In terms of rendering, there is no GLSL TOP, and Mat components only have four types: Phong material, Constant material, wireframe material, and depth material. In terms of additional functions, there are no applications of various new technologies nowadays, and there are relatively few components for hardware access. Overall, 077 still leans towards real-time image production and broadcasting control.

TouchDesigner 088

The official final version of version 088 is (62960), the first version should be released in 2013, and the next version is the first version of 099 released in 2017. Compared to the 077 version, the 088 version has significantly improved the UI image quality, and the graphical interface is also less hardcore, greatly enhancing readability. More importantly, in version 088, there has been some technical support for 3D Mapping and native components specifically designed for hardware such as Kinect and Leapmotion. In this version, Python language is also fully used, enhancing its scalability. GLSL related components have also been added in version 088, greatly expanding the possibility of utilizing GPU computing. From this, it can be seen that TouchDesigner is following up on the emerging forms of interactive imaging.The basic functions of version 088 may not seem much different from version 099, but if you look at the release notes when version 099 was released in 2017, you will find that version 099 is equivalent to a major overhaul of version 088: a comprehensive update to the Python library, optimization of the functions of various components... This is how we built the 099 version we are currently using.

At this point, I have provided a brief overview of the entire development process of TouchDesigner. My biggest impression is that TouchDesigner, compared to "industrial grade" software like Houdini, is more like a lightweight "multifunctional knife" that can adapt to our current demand for real-time interactive images in daily life scenarios. The digital art methods based on computer graphics are no longer new in the film and television industry, and the same is true in the field of electronic games. However, both film and video games are standardized "arenas" for digital art, and there are still many challenges and possibilities for innovation in the process of integrating digital art into our daily living space. This may be part of the reason for the rise of real-time interactive multimedia content creation tools like TouchDesigner.

Last year, Derivative released the latest Experience version of TouchDesigner, adding many new features and rewriting the kernel. TouchDesigner has not yet achieved much in terms of rendering quality, but its interactive features have always been very useful, and when combined with Unreal as a controller, it can also be used for virtual production.

The Development of Touch Designer Related Art in China

Image art was born in the 1990s, mainly referring to Video art. The emergence of image art is a major symbol that distinguishes art in the 1990s from art in the 1980s.

The avant-garde art of China in the 1990s was mainly divided into two stages. In the mid to early 1990s, it was mainly manifested as extensive experimentation and use in media such as installations, performances, photography, and video recording. In the late 1990s, it was manifested as the use of all means of media experimentation in the mid 1990s to express social and cultural criticism themes. Although there were also experiments in installation art and performance in the late 1980s, the traditional medium that truly broke through traditional painting and sculpture on a large scale in the media was still in the early 1990s. Another characteristic of the popularity of installation art and performance in the early 1990s was the combination with conceptual art.

In the mid-1990s, the truly avant-garde experiment in new media art was the rise of video art. In the late 1990s, with the popularization of computer vision technology, technologies such as interactive technology, network technology, Flas technology, electronic game technology, three-dimensional vision technology, and computer digital editing technology began to enter the production of Video art. An important change in the late 1990s was that video art was no longer presented as a pure experiment of technological media and conceptual art, but instead used video art to reflect the cultural transformation of Chinese society, expressing social and cultural criticism themes, such as female art and youth art. In addition, Video art began to integrate with multimedia avant-garde drama, clay animation, and electronic games in the late 1990s.

The Early Form of Video Recording: A Record of Conceptual Art, The initial rise of video art in China was mainly manifested in the fact that video still only relied on conceptual art and installation art, and did not truly form its own image concept of single screen video art. This origin is actually similar to the formation of Western Video art. During this period, video art was not yet a true form of video art, but rather a form of video usage. It is mainly manifested in two aspects: firstly, Video is a means of recording conceptual art, transforming conceptual art into literature, or extending and disseminating it through Video literature; Secondly, as a form of conceptual art

expression, Video is an installation form, which is a part of the entire installation environment or conceptual installation.(Source: Art China September 13, 2011 08:17)

The earliest practitioners of this early video format were mainly Zhang Peili. He used videos to record his conceptual art as early as 1988, such as his work "30X30" depicting the process of breaking glass. In the early 1990s, he began to use video single screen television playback combined with installation environment to express conceptual art, such as his video "(Wei) Zi San" (1991) depicting the process of washing a hen with one hand, expressing an ironic attitude towards cultural solemnity. This video was also installed in the form of a television during the "Garage Exhibition" held in Shanghai in the same year. The recording part was in the form of a single video four screen television, and the video environment was also arranged with building bricks in front of the recording.

Figure 2 Conceptual art 1
Source: https://www.artron.net/

Figure 3 Conceptual art 2
Source: https://www.artron.net/

Qian Fengkang and Chen Shaoxiong have been conducting experiments on installation and conceptual art in the early 1990s. Their conceptual device and media experiment used displays and video devices, such as Qian Huikang's conceptual device "Wind Direction: White Quantity 205 grams" (1993), which used a television monitor to play a video of an electric fan rotating and blowing, forming a device environment with powder products on the ground. Chen Shaoxiong's TV installation "Changing the TV Channel, Changing the Bride's Decision" (1994) is a television installation that expresses popular cultural irony using ready-made products such as televisions and wedding dresses. In 1995, Wang Gongxin made a behavioral installation video "Brooklyn Sky" in his own home, and Qiu Zhijie's video "Bathroom" (1994) also used the art form of Video in conceptual art. Wang Gongxin's' Sky in Brooklyn 'aired a video of the Brooklyn skyline on a television in a well dug up at his home. Some artists, such as Ma Liuming, Zhu Fadong, and Wang Jianwei, also began using video recordings to record their performance and emphasize the conceptual art of the process around 1994.

Figure 4 Conceptual art 3
Source: https://www.artron.net/

In the early 1990s, the early form of video art in China was manifested as the recording of conceptual art and the way in which conceptual expression was carried out in the form of installed videos. Due to technological and conceptual conditions, this early form basically lacked experiments on video images themselves. The content of video images was mainly completed through behavioral performances and on-site filming.

（1） 1990s: The formal formation of Video art：

Video art began to truly take shape in the mid to late 1990s. This is reflected in an increasing number of artists creating videos as an independent form of art, no longer solely using the form of video art as a means of recording and expressing conceptual and installation art. This is manifested in two aspects: firstly, it focuses on visual experiments of Video images themselves, no longer relying solely on performances, ready-made events, and environmental photography as the "ready-made images" of Video. Especially in the late 1990s, a large number of visual technologies such as animation, 3D vision, and computer image processing began to be used for the creation and experimentation of Video images; Secondly, the video form is no longer a subsidiary part of conceptual art and installation environment. On the contrary, installation methods such as installation, environmental layout, on-site single screen and multi screen projection are all used to serve the visual expression of

video art. After 2000, interactive technology and electronic game technology also participated in the interactive expression of Video art, and Video art began to combine with the stage performance of multimedia avant-garde dramas.

Around 1996, video art was truly formed and reached a climax in China. During this period, video mainly manifested as video images undergoing some visual experiments under a "low tech" condition, followed by video devices entering a relatively mature stage in terms of form and spatial environment.

In terms of imaging experiments, Zhu Jia, Li Yongbin, Qian Huikang, and others began experimenting with pure imaging under the condition of imperfect technical equipment. Li Yongfu's single screen video "Face" (1996) overlaps his own face with his mother's face, but he did not use computer image synthesis technology. Instead, he projected a portrait of his mother on his own face using a slide and then remade it on video. Qian Baokang's "Breath, Breath" (1996) used simple television image synthesis technology to present some media images in the human eye area.

Compared to the rudimentary visual style of imaging experiments, video installations have become increasingly mature in form due to the extensive pioneering practice of installation art in the early 1990s. This phenomenon was highlighted in two important exhibitions in 1996. One exhibition was "In the Name of Art" curated by Zhu Qi in May 1996. In addition to a summary display of installation and conceptual art practices in the early 1990s, Chen Shaoxiong and Song Dong also exhibited their Video works at this exhibition. At the end of the same year, the Video installation received more display at the video art exhibition "Phenomenon Video" organized by Wu Meichun and Qiu Zhijie. The integration of videos and devices in language is no longer just an expression of concepts attached to each other, as in the early 1990s. Wang Gongxin's "Bench" (1996) and "Baby Language" (1996) were representative works of the mature language and style of video installation technology during that period. Baby Talk "depicts a projector projecting a video of a baby crying from the roof onto a crib, while the screen receiving the video projection is a thin layer of milk water laid on the crib board.

In the late 1990s, video imagery and video installations exhibited more mature visual experiments and language styles in the works of Chen Shaoxiong, Song Dong, and others. Chen Shaoxiong's "Vision Corrector" not only portrays a sculptural form

in installation form, but also conducts many experiments in image display and spatial environment. He filmed a segmented image of a complete action of the same character on two TV dual videos, but caused the illusion of single video dual screen playback on the image. His 1997 "Vision Corrector" series also featured a video played in the bathroom and could be viewed through the reflection of the mirror above the sink. Song Dong's "Father and Son" (1999) attempts a Chinese style video space and visual style. His "Father and Son" (1998) projected a video of his father's self narration onto his own face for re filming, and the overlapping image of the father and son was projected onto the pillars of the Beijing Temple. This work attempts to experiment with a family connection between the local spirit of Video in terms of spatial context and image internality. (Source: Art ChinaSeptember 13, 2011 08:17)
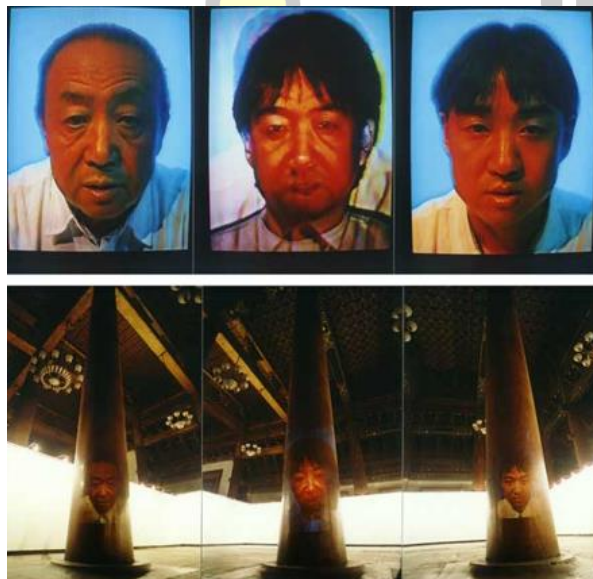
Figure 5 Vision Corrector

Source: https://www.artron.net/

After the mid-1990s, Chinese video art not only truly formed and matured in terms of the concept and expression of video art, but also began to extensively utilize computer image processing technology after the late 1990s.

（2）Cultural themes and the involvement of computer technology：

In a sense, the 1990s can be seen as the embryonic and formative period of Chinese Video art. It not only took shape in the early 1990s, but also gradually

matured into a true new media art in terms of language style and visual technology by the late 1990s.

Since 2000, Chinese video art has mainly manifested two new trends: firstly, video art has gone to two extremes in terms of technical language. One extreme is the deliberate pursuit of a low-tech style, where video production rarely uses electronic image processing technology in addition to simple shooting, editing, and editing techniques; The other extreme is the extensive use of computer image generation and processing technologies that became popular in China in the late 1990s, such as interactive technology, gaming technology, Flas technology, digital image synthesis technology, etc. Secondly, another trend of video art is that it no longer only focuses on the technical language and image experiments within the boundaries of video art, but attempts to view video as an individual's expression of social and cultural criticism themes. This type of video art often manifests as the use of low tech language styles.

The low tech style of Video is portrayed as an early style in Wang Jianwei's video "Production" (1997). This work selected tea houses in five townships in Sichuan for on-site filming, adopting a rough visual style of a documentary, attempting to depict the production process of a social visual experience in tea houses and public places.

Around the year 2000, Cui Xiuwen, Cao Kai, and Xu Zhen's videos portrayed a theme of social criticism, modernity, and youthful art through a low tech style. Their videos attempted to reduce the interference of image technology in theme expression and more actively turned the visual experience into a realistic style.

The use of performance in Video art tends to be more dramatic and narrative after 2000. Especially in feminist themes, works such as those by Chen Qiulin and Cao Fei depict a visual style that blends female vision, youthful art, and postmodern drama. Chen Qiulin's "..." (2001) and "Bie Fu" (2002) have a sentimental atmosphere of feminism, while Cao Fei's "Imbalance 257" (1999) and "Dog" (2002) have a more melodramatic element in visual narrative. In terms of performance and plot performance, Yang Fudong conducted extensive experiments on the language of video imagery in the late 1990s.

In the early 2000s, Wang Jianwei, Wang Guofeng, and others also participated in the stage video practice of multimedia avant-garde drama. Screen "(2000) and" Ceremony "(2003) are multimedia dramas written and directed by Wang Jianwei. In both dramas, Wang Jianwei used pre recorded video projection in the center of the stage as a narrative background. The avant-garde drama "Beijing Terminal" (2004), in which Wang Guofeng participated, directly intervened in the theatrical experiment using Video.

An important phenomenon of Video art in the late 1990s was the intervention of computer imaging technology, which led to a truly meaningful imaging experiment in the field of computer imaging. Feng Mengbo was an early practitioner in the use of computer digital imaging technology. He began using computer animation and video game technology in the mid-1990s to create short animated films with political images as visual themes and videos using electronic game programs, such as his "Apple Diary" (1994 95) and "Hitting Tiger Mountain" (1994 95). Feng Mengbo used more electronic technology in some of his video works from the beginning of the new century, such as his "Ah Q (Death Realm, Q4U Dance Pad Version)" (2002), which used game devices, PC dance blankets, and sound systems.

Figure 6 Computer digital imaging technology

Source: https://www.artron.net/

（3） In the tenth year of the new century :

Cartoon, Flas, and video game interaction, The use of Flas and electronic game interaction has formed a climax in the imaging experiment in the new century decade. Since 2000, video art has extensively used computer technology, such as image editing, collage, dynamic editing, 3D imaging, and audiovisual synthesis. The technical level of Chinese new media art is actually still at an early stage. But in the early 1990s to the present, the visual art of Chinese Video and photography has truly formed its own language style, conducting comprehensive practice in almost all aspects such as image experiments, computer technology, installation space, narrative style, and gradually gaining widespread attention in the international art community.

Flas, interactive, and electronic game technology were applied in the visual practice of Video by Wang Bo, Tang Maohong, Gu Dexin, Zhou Xiaohu, Hu Jieming, Zhang Jiangshan, and others in the early 2000s. Like Wang Bo's "Who Killed Me?" (2003), which uses Flas technology and online gaming programs, Hu Jieming's "Up and Up" (2004) is an interactive video device that allows viewers to influence the movements of characters standing in the TV columns on the exterior wall of the Shanghai Art Museum through sound. As long as they shout in front of the TV columns, the people on the TV columns will climb up and cross each TV screen.

Cao Fei's "RMB City Fortress" (2007) and Lin Xin and Zheng Da's "The Origin of Multiple Objects" (2008) are recent experimental works using interactive programs such as 3D virtual images and electronic games. The works all use modeling techniques of three virtual spatial buildings, while the audience can manipulate the scene on-site like playing an electronic game. If you are not participating in an exhibition, your work is usually placed on a dedicated website, and you can enter the work and participate in interaction through the internet, just like operating an online game. (Bangs, 2007)
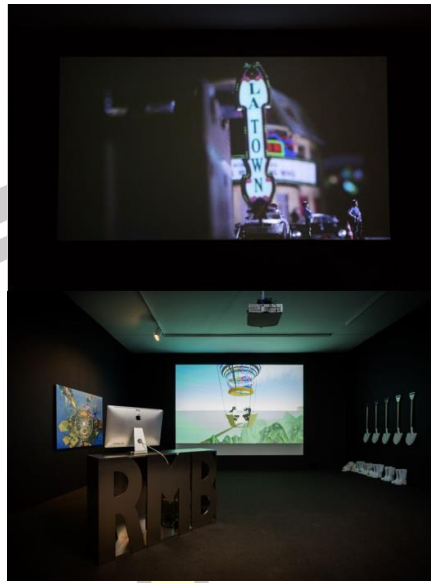
Figure 7 The Origin of Multiple Objects

Source: https://www.artron.net/

The interactive art of Video in the new century not only uses electronic gaming methods, but also incorporates cartoon animation images in the visual style. From the earliest works of Wang Bo to the works of Cao Fei, Lin Xin, and others in recent years, it reflects the influence of cartoon vision on the images of artists born in the 1970s.

But not all Video animations are cartoon style. The hand-painted black and white animation by South African artist Kentucky has had a great impact on young Chinese artists. Black and white animation is similar to Chinese ink and wash animation, but it injects contemporary art concepts and historical consciousness into it. Domestic artists such as Qiu Anxiong's animation "Republic of China Style" use black and white ink to allegorically express their historical imagination of the customs in the country.

After more than ten years of artistic practice, Chinese new media art has completed learning from the West, especially conducting experiments on sinicization in terms of work concepts, influence patterns, and themes. However, as the core of new media art: technology, there is a significant gap between the current level of technology and the true high-tech new media art abroad. The main reason is that the system of new media art has not yet been established. Although a small number of

artists' new media works have already had certain market sales and received sponsorship from foreign art foundations, China has not yet established its own new media art center and foundation.

The production and cost of new media art often exceed the individual capacity of artists. In foreign countries, there are usually specialized new media art foundations or comprehensive art foundations for funding sponsorship, and new media art centers provide production equipment and engineers to help artists complete their works. However, this step has not yet taken shape in China. But new media art is the most promising new art of the 21st century. I believe that with the development of society, China's new media art will also receive greater support and establish its own style.

4.1.2 Chronicles of China's New Media Art Exhibition (2000-2020)

In the 1990s, China's new media was dominated by video art, and the editors chose the technology new media ecology from 2000 to 2020 as an important stage to sort out the broad new media exhibition ecology: digital, interactive, physical technology, biology, artificial biomimetics, and experimental imaging. The year 2000 was the turning point of China's new media types, If there were any important ideological trends that emerged after 2000? Technology media art is one of the most influential phenomena, bringing us new ethical, spatial, and intellectual changes in various fields, therefore it is highly worth organizing. The purpose of this "New Media Art Brief" is not to pile up comprehensive information. The exhibition focuses on promoting domestic and local curators and artists as the main background resources. The brief is a choice that balances objective and subjective value judgments.

2000

On January 8th, the "2000 China Online Imaging Art Exhibition" was held at Jilin Academy of Arts. Curators: Huang Yan, Hai Bo, Jiao Yingqi, and 48 participating artists including Jin Feng, Huang Yan, Cang Xin, Guan Ce, Song Dong, Xu Yihui, Gao Brothers, Wen Prin, Qiu Zhijie, etc. This is the first contemporary art exhibition in China titled "Internet", but there are few interactive works on the internet.

Hong Kong holds the "2000 Microwave Recording Festival". The "Video Circle 2000" organized by Rong Nianzheng was held at the World Cultural Palace in Berlin.

In July, the solo exhibition of Song Dong's video installation "Song Dong in London" was held at the Tablet Gallery in London. Wang Jianwei's first multimedia drama "Screen" was performed in Beijing. The "Non cooperative Way" exhibition, planned by Feng Boyi and Ai Weiwei, was held in the warehouse and Donglang Gallery by the Suzhou River in Shanghai. The exhibition and art collection sparked a great discussion about "performance art". Song Dong, Cao Fei, Lu Chunsheng, and others exhibited their video works. The "Daily and Everyday" planned by Gu Zhenqing opened at the Shanghai Yuangong Art Museum, and Song Dong implemented a video projection of the performance work "Touching the People".

From the end of 2000 to the beginning of 2001, the first new media art center in China, the Beijing Cangku New Media Art Center, was established, presided over by Wang Gongxin and Lin Tianmiao. Cangku New Media Art Center is the first new media art exhibition space in China, dedicated to providing a space for new media art creation and release, discussion and exchange, information retrieval, and even work collection.

2001

On March 1st, Li Zhenhua, Qiu Zhijie, and Wu Meichun planned to hold the Tibet Cool Digital Art Festival at the Beijing Tibet Cool New Media Art Center. The participating artists include Shi Qing, Chen Shaoxiong, Qiu Zhijie, Jiang Jianqiu, Jiao Yingqi, Zhou Xiaohu, Ni Weihua, Shi Yong, Fu Yu, and others. The exhibition showcases works based on domestic digital processing methods, mainly including flat digital works, interactive multimedia works created in CD-ROM format, Flash animations, and computer game works, almost covering all potential online avenues for the development of new media art.

On March 10th, "Post Sensibility: Carnival" planned by Qiu Zhijie was held in a studio at Beijing Film Academy. The participating artists include Urshan, Qiu Zhijie, Zhang Hui, Liu Weihua, Wang Wei, Gao Brothers, Liu Wei, Shi Qing, and others. Post sensibility "was a radical new trend in Chinese art at that time, which had a certain impact on China's installation art, performance art, and performance art.

On March 23rd, the "Virtual Future - China Contemporary Art Exhibition" planned by curator Gu Zhenqing was held at the Guangdong Art Museum. This exhibition is a work created by artists from oil painting, video, multimedia, internet, installation, and other fields through their vision for the future. There are Weng Fen, Song Dong, and others exhibiting video works.

On December 15th, "Feeling Money" planned by Tang Xin was held at the top floor art space of Taikang Building in Beijing. Li Songhua and Song Dong exhibited video projection devices.

The China Academy of Fine Arts has opened a New Media Research Center, and the Design Department of the Central Academy of Fine Arts has opened a Digital Art Studio.

2002

On June 28th, the Long March Space launched the "Long March - A Walking Visual Display" large-scale cross-border art project, the Long March Plan. Through various artistic practices such as outdoor art exhibitions, photography exhibitions, installation creation, performance art performances, and film broadcasting.

In September 2002, Yang Fudong's film "Strange Paradise" participated in the 11th Kassel Literature Exhibition.

On October 2nd, the "Harvest" planned by Gao Minglu was held at the Beijing Agricultural Exhibition Hall. The participating artists include Huang Yongping, Xu Bing, Gu Dexin, Yin Xiuzhen, Li Zhanyang, and Song Dong. Song Dong exhibited a video and performance work called "Bonsai".

On November 18th, the "First Guangzhou Contemporary Art Triennial - Re interpretation: Thirty Years of Experimental Art in China (1990-2000)" planned by critic Wu Hongzhu was exhibited at the Guangdong Art Museum. This exhibition features a special review of Chinese video art, planned and organized by Qiu Zhijie and Wu Meichun, showcasing 50 works. At the same time, Qiu Zhijie wrote "The Rise and Development of Video Art: 1990-1996" and "The Maturity of New Media Art: 1997-2001" for this exhibition.

On December 14th, "Synthetic Reality: China Contemporary Video Art Invitation Exhibition" was exhibited at the Beijing Ocean Art Center; The

participating image artists include Chen Shaoxiong, Geng Jianyi, Li Yongbin, Ni Haifeng, Shi Yong, Wang Gongxin, Wang Jianwei, Zhu Jia, and Zhang Peili.

2003

July: China Academy of Fine Arts established the "New Media System", with Zhang Peili serving as the department head.

In September, Song Dong's video projection device "The Boundaries of Breaking Mirrors" created in the field participated in the "8th Istanbul Biennale".

From September 17th to October 16th, Gu Zhenqing planned an exhibition titled "Second hand Reality - Crossing between Pre reality and Post reality" to be exhibited at Today's Art Museum.

The exhibition "Subei Asia: The Near Future of Media Art" was exhibited at the Contemporary Art Museum in Hiroshima, Japan, with Chinese image artists including Feng Mengbo and Wang Gongxin participating. The exhibition "Cinema: Zhang Yonghe, Wang Jianwei, Yang Fudong" was held at the Municipal Museum of Modern Art in Paris, France.

Qiu Zhijie filmed a special film for the "Land of Destiny" project at the China Academy of Fine Arts and completed 8 50 minute long works in the "Asian Time" series. And it was first exhibited at the anniversary exhibition of China Academy of Fine Arts in September. Subsequently, the "Asian Time" series held solo exhibitions at the Shenzhen Academy of Fine Arts and the Hong Kong Museum of Art, as well as important group exhibitions such as "Hot Wind Variations: 6th Guangzhou Biennale".

2004

On November 30th, the "2004 New Media Art Festival: Maze" planned by Wu Meichun was grandly held at the Nanshan Campus of the China Academy of Fine Arts. In November, the "Microwave International Media Art Festival 2004" at the Hong Kong Great Hall also attracted countless residents.

The "Visual Behavior" planned by Wu Hong was held at Walsh Gallery in Chicago. Chinese image artists Song Dong and Wang Gongxin exhibited their works. The Chinese - Contemporary Photography and Video of China "was held at the Kunstmuseum Art Museum Wolfsburg Germany.

Song Dong participated in the "Slow Impact" exhibition held at the Vilnius Contemporary Art Center in Lithuania. The "Asian Transportation" planned by Huang

Fu Binghui was held at the 4A Art Museum in Sydney, Australia. Image works by Song Dong, Wang Jianwei, and Sun Yuan+Peng Yu were exhibited at the exhibition. Feng Mengbo's interactive installation work "Ah Q" won the Prix Ars Electronics Interactive Art Excellence Award in Austria. Song Dong's video work "The Story of Traditional Chinese Medicine" participated in the "Traditional Chinese Medicine" exhibition held at the Shiseido Art Museum in Tokyo, Japan.

On November 18th, "Xu Tan: Relaxed" was held in Guangzhou Vitamin Space. The works on display are five video and video installation works by Xu Tan, including Made in China, New Curator and Lobster Contemporary Art Center, Zheng Daoxing Concert Hall, Good Air and Xintiandi.

The international new media art exhibition "Paradise Plain", organized by Creative Time, was exhibited at the slaughterhouse at the end of the New York Elevated Railway. Song Dong's video work "Burning Photos: The End of the Elevated Railway" was exhibited at the exhibition.

On December 24th, the first Cross Media Art Festival of "Mystic City: Hacking into Reality" was exhibited at the Art Museum of the China Academy of Fine Arts. Curator: Yao Dajun, Ma Nan, Gao Shiming.

2006

On January 21st, the "Mystery Palace: Multimedia Performance" was held at the Modern Art Experimental Center of Shanghai Ming Dream Factory. Performance combines the genes of video art, documentary, performance art, and drama, attempting to engage in dialogue with space, history, and people in a new form of comprehensive live art. Created by the Overall Art Studio of China Academy of Fine Arts and Beijing Yixiangju Art Studio.

May: The Asian media art "Exposure: Black Box and Crystal Ball", curated by Han Yi curator Li Zhiyun, was exhibited in public spaces in London. Song Dong's video works are on display.

On July 22nd, the China Century Monument was hosted by the Beijing Gehua Cultural and Creative Industry Center and Tsinghua University, and organized by the Beijing Creative Space Art Center and Tsinghua Academy of Fine Arts. The 2006 Beijing International New Media Art Exhibition and Forum revolved around the theme of "Code: Blue" and showcased representative works of communication art,

network art, remote sensing art, interactive cinema, physical technology, and other art forms based on media technology in recent years.

On November 19th, Lu Chunsheng's work "History of Chemistry 2" was first exhibited at the Shanghai Biyi Art Center.

2007

On September 20th, the "Stereoscopic Mirror: International Imaging Art Exhibition - Art Beijing 2007 Special Exhibition" was exhibited at the China Art Center on the Beijing platform. The participating artists include Jin Shan, Sun Xun, Ma Yongfeng, Chen Jieren, Liang Wei, and others.

On October 19th, the "First Shanghai Electronic Art Festival" was grandly opened at the Music Hall of Shanghai Oriental Art Center. The new media system of China Academy of Fine Arts is an important participant in the first Electronic Art Festival. The "Stacking - New Media System Student Works Exhibition of China Academy of Fine Arts" planned by Zhang Peili was held on the same day at the Pudong New Area Library. The Shanghai Electronic Art Festival will be held once a year in October, and the activity area will be settled in Pudong for a long time.

On November 3rd, the "Amateur World Contemporary Art Exhibition" opened on the Beijing platform at the China Contemporary Art Institute. The participating image artists include Yuan Chen Xiaoyun, Cheng Ran, Lu Chunsheng, Lu Lei, Sun Xun, Tong Biao, Wu Junyong, Ye Linghan, and others.

The Real Thing: Contemporary Art from China was held in Liverpool, UK. The participating artists include Wang Gongxin, Qiu Zhijie, Xu Zhen, Geng Jianyi, Zhou Xiaohu, and others.

The Chinese Contemporary Art Exhibition "China Now" planned by Feng Boyi was held at the Cobra Contemporary Art Museum in Amsterdam, Netherlands. Song Dong's 9-screen video projection device "Stir fry Beijing" participated in this exhibition.

On December 1, 2007, the "07 Image Archives Exhibition [798]" opened at the Contemporary Art Center in the OPEN Art District of Beijing, curated by Zhang Haitao.

2008

In April, the Image Archive of the Iberian Contemporary Art Center (CIFA) planned a themed screening unit for the opening exhibition of the Beijing Iberian Contemporary Art Center, titled "Relocation: Alternative Perspectives and Insights in Documenting Images".

On the afternoon of November 15, 2008, the opening ceremony of Tan Liqin's large-scale solo exhibition "Digital Primitive", curated by Wu Hong and Liu Libin, was held at the China Century Monument. This exhibition will focus on Mr. Tan Liqin's exploration and creation of animation installations, conceptual animations, interactive animations, and digital printing series in recent years.

On November 28th, the third Beijing Independent Film Forum/Video Short Film Unit was selected by Zhang Haitao, who made the experimental images one of the important units of the film exhibition. In the future, the experimental images will be held in conjunction with the plot and documentary as the three regular units of the film exhibition.

On November 28th, Wuhan Art Group WAZA held a solo exhibition on video installations called "Blood" at the Alario Gallery in Beijing.

2009

On March 29th, "The Image Archive (CIFA) of the Iberian Contemporary Art Center opened its exhibition - What happened here?" was held at the Iberian Contemporary Art Center in Beijing. The exhibition mainly consists of three parts: film screening, literature exhibition, special lectures, and discussions, attempting to comprehensively present the decade of independent imaging development.

From August 29, 2009 to October 11, 2009, the "Virtual Reality: Asian Contemporary Art Exhibition" was exhibited at the Chen Linghui Contemporary Space, featuring six contemporary image artists from China, Taiwan, Japan, and South Korea: Han Lei, Hong Lei, Hong Donglu, Kamaku Chutaro, Keisuke Narita, and Hye Ram Lees.

On September 10th, the third Shanghai Electronic Art Festival opened with the theme of "System Updating" and was divided into three major project sections: "eARTS BEYOND Shanghai International Gallery Media Art Invitation Exhibition", "Perfect Illusion China Belgium Media Art Exchange Exhibition", and "New Media Archaeology Academic Research Project".

On November 25th, the first stop of the "Delayed Sino Swiss Media Art Joint Exhibition" was held at the China Art Museum. The exhibition brings together Chinese artists Cao Fei, Chen Shaoxiong, Hu Jieming, Zhang Peili, Qiu Zhijie, Jin Jiangbo, and Swiss artists Peter Aerschmann, Arthur Clay, Herve Gaumann, Alexander Hahn, Timo Loosli, Valentina Vuksi Daniel Werder's new media art work (Qiu Zhijie showcases interactive multimedia work "International Airport Republic"). In March 2010, it toured to the Birr Museum of Contemporary Art in Switzerland.

On December 7th, Zhang Peili's solo exhibition "Four Seasons in China: Gusts" was held at the Govett Brewster Art Museum in New Plymouth, New Zealand.

Song Dong's video works participated in the international video exhibition "The End of Video" held by the LOOP Art Museum in Seoul, South Korea.

2010

On April 18, 2010, the artistic director of the "2010 Image Archives Exhibition" was Li Xianting, curators were Wu Qiuyan and Zhang Haitao, and the forum project director was Teng Yuning. The opening venue was Songzhuang Art Museum, and the exhibition was held from April 18 to May 25, 2010. The exhibition was divided into the following units: "Field", "Domain", "Emotion", "Nature Unnatural", and "Gathering and Remembering".

On October 19th, the "Encoding and Decoding - International Digital Art Exhibition" was held at the Central Academy of Fine Arts Museum. The exhibition was jointly planned by the National Victoria and Albert Museum (V&A) and onedotzero in the UK, with SAP support. It is the China station display of the World Tour, following the huge response from the art community and audience of the V&A "Decoding: Digital Design Sense Exhibition" in the UK. The exhibition aims to break the traditional display method of static presentation of works, subvert the audience's inertia of watching works in silence, and explore the transformation of artists' creative tools and thinking methods through the intervention of digital technology in art. It emphasizes the interactivity between the audience and the works, as well as the inevitable trend of fundamental changes in human thinking brought about by the rapidly changing information flow in the digital era.

His works include Qiu Zhijie's multimedia interactive work "International Airport Republic" and others.

On December 16th, the "Out of the Box" video exhibition opened at the Boers Li Gallery. The participating artists include Chen Shaoxiong, Geng Jianyi, Li Yongbin, Wang Jinsong&Xiaohong, Wang Gongxin, Wang Jianwei, Wang Peng, Xu Tan, Yang Fudong, Yang Zhenzhong, Zhang Peili, Zhou Tiehai, and Zhu Jia.

2011

On April 16th, the exhibition "From Interaction to Micro Sociology: The Dual Clues of Dutch/Chinese Media Intervention in Art" was held at ISSUE Projects in Beijing. In addition to showcasing works, the exhibition also presents a large number of video art documents spanning the Netherlands since the 1960s and China since 1988. This is an intersection of physical, video, DIY, interaction, sound, and visual aspects.

On December 2nd, the opening ceremony of the 2nd VAFA International Video Festival, jointly organized by Quanyi Society and the Oriental Foundation, was successfully held at 6:30 pm on December 2nd (Friday) at the Oriental Foundation. Nearly 100 guests from the art and cultural community attended the opening ceremony. After the first VAFA International Video Festival last year received unanimous praise and was exhibited in Macao and Beijing, this year's conference continued its efforts. From June to August, it conducted a public solicitation activity around the world, collecting a total of more than 160 entries. Nearly 100 artists from all over the world, including four places on both sides of China, Germany, Sweden, the United Kingdom, Italy, Türkiye, India Singapore and Chile and other countries and regions have also received many local video works.

Zhu Jia, Chen Dong, and Fang Lu jointly established a private non-profit organization called the Video Bureau, which focuses on video art. It showcases video works and archives in Beijing and Guangzhou, and holds artist lectures and thematic discussions.

2012

On July 21st, Zhang Haitao, Gao Yiyuan, and Fang Lei planned the "Biology Ecology - Sino Dutch Contemporary Art Exhibition" at the Songzhuang Art Museum, where Chinese and Dutch artists gathered to use biological materials as media to focus on the ecological topics of biology.

From October 2, 2012 to March 31, 2013, "Roy Ascott: Synthetic Cybernetics" was exhibited at the Shanghai Museum of Contemporary Art, curated by Yuan Xiaoying. Roy Ascott is an internationally recognized pioneer in media art, active in the field of media art as both an artist and a theorist. He creatively incorporated cybernetics and telecommunications into media art creation, dedicated to studying the impact of digital and remote communication networks on consciousness.

On December 22nd, the exhibition kicked off at B10 Art Space in the North District of OCT Creative Culture Park, and will continue to be exhibited until March 22nd, 2013. The curator team composed of Wang Chunchen, Zhang Xiaotao, and He Jinfang conducted a literature review on independent animation in China, marking the first time in China that independent animation has been elevated to a biennial scale.

2013

On April 28th, Zhang Haitao planned an artificial function art exhibition called "Induction · Touching" with sensors at the Yuandian Art Museum.

November 30th - December 1st: "100X100=900 International Video Art Exhibition -100 Video Artists Telling a Century" China screening event, curated by Zhang Haitao, screening time: November 30th - December 1st, 2013 (daily 14:00-18:30 pm), screening location: Li Xianting Film Foundation

2014

On June 10th, the "Qi Wu et al. View: International New Media Art Triennial" was exhibited at the China National Art Museum. The series of exhibitions explores the cognition and development trends of new social and cultural phenomena in the contemporary context of technological time and space construction, providing an important platform for international cutting-edge media art creation, discourse, and display. Curator: Zhang Ga.

From June 15 to September 14, China's first exhibition to systematically introduce international cutting-edge sound installations will become the first cross-border new media art exhibition integrating sound art, visual art and contemporary design in Chinese Mainland. Exhibition location A4 Contemporary Art Center, curated by James Giroudon.

From July 26th to September 4th: "This Summer We Love Photography - Imaging Art Exhibition", exhibition location: 798 Art District, No. 2 Jiuxianqiao

Road, Chaoyang District, Beijing. Artists: Pia Mewald, Bai Shuangquan, Adam Pandelton, Qiu Anxiong, Michelle Rufna, Shen Ruiyun, Song Dong, teamLab, Zeng Yuqin, Cui Guangyu, Bill Viola, Huang Rongfa, Yuan Guangming.

October 20-24: The International Short Film Unit of the First Silk Road International Film Festival and the 5th Xi'an International Film Festival, curated by Dong Jun, Wu Meng, Hao Guoqing, Cheng Wei, and specially invited curators: Ashish Vital Rajadhyaksha (India), Dan Zuolong, Zhang Haitao, Enrico Tomaselli (Italy), screening location: Xi'an Qujiang Pacific Cinema

November 15th: "Transmutation" Bill Viola solo exhibition, exhibition date: November 15th, 2014 to March 22nd, 2015, exhibition address: 798 Square, Courtyard 2, Jiuxianqiao Road, Chaoyang District, Beijing, Lin Guan Art Foundation

2015

From January 17th to February 28th, Zhu Ye's "Human-Machine Future" was exhibited at the Shanghai Minsheng Modern Art Museum. Presenting 18 pieces/set of image and installation works by multiple artists and institutions both domestically and internationally. Explore the smart future of collaborative innovation between humans and machines with participants by showcasing the world's most advanced digital construction works based on robot platforms.

March 21st: "In the Present - Wang Gongxin's Twenty Year Image Art Exhibition" Opening Time: March 20th, 2015, 18:00-21:00; Exhibition time: March 21st to May 24th, 2015; Exhibition location: OCAT Shanghai Museum, No. 30 Wen'an Road, Zhabei District, Shanghai. The OCAT Shanghai Pavilion is honored to present a solo exhibition by media artist Mr. Wang Gongxin: "In the Present" - Wang Gongxin's Twenty Year Image Art Exhibition. This exhibition has abolished the commonly used "curator artist" binary structure, giving artists more freedom to establish exhibition space and contextual connections between works. At the same time, it continues the support of OCAT Shanghai Museum for media art and encourages positive exploration spirit.

On May 27th at 16:00, the "Moving Again: B3+BEIJING Dynamic Image Exhibition" will be held from May 27th to June 21st, 2015. The exhibition will be held in the second floor exhibition hall of the Art Museum of the Central Academy of

Fine Arts, with chief curators Wang Huangsheng and Song Xiewei, and executive curators Wang Chunchen, Jin Jun, and Fei Jun.

On July 18th, Haite Steyer held a solo exhibition at Shanghai BANK Space. The artist explored the mass dissemination of images and knowledge driven by digital technology. The exhibition showcases the work "How to Be Seen: A Goddamn preaching device", which is a tutorial on how people become invisible in the digital world. In 2012, "The Miserable Screen" published by Sternberg Publishing included artists' papers on image politics published in e-flux journals.

October 16th - November 8th: "Permeability" Joint Exhibition of Imaging Arts of Eight Major Art Institutes, Opening Time: 2015-10-16 16:00, Exhibition Venue: Hubei Art Museum, Curator: Xia Zi Yuan Xiaofang, Academic Host: Ji Shaofeng, Organizer: Hubei Art Academy, Hubei Art Museum, Exhibitors: Wan Qiange, Wang Xiaoxin, Wang Mengyao, Ye Funa, Yang Xiaoman, Yang Chen, Zhang Xiaotao, Zhang Liaoyuan, Zhang Mang, Zhuo Kailuo, Fei Jun Zhu Hong, Gao Shiqiang, Jia Chun, Tao Tao, Mei Jian, Dong Jun, Jian Xiaomin, Lu Changbu, Yan Yu.

December 17th: Asia Perspective: AMNUA International Imaging Forum and Special Exhibition, Forum and premiere time: December 17th to 20th, 2015, Exhibition time: December 17th to January 5th, 2016, Venue: Nanjing Academy of Arts Art Museum, Nanjing Academy of Arts Media School, Curator: Zheng Wen, Co Curators: Sakai Shiwa (Tokyo), Cao Kai (Nanjing), Fenlei (Hangzhou) Guo Xiaohui (Kuala Lumpur), Guan Huaibin (Hangzhou), Gao Shiqiang (Hangzhou), Jos é Drummond (Macau), Li Xingjun (Seoul), Liu Yonghui (Taipei), Sheng Jin (Nanjing), Wen Jingying (Hong Kong), and Zhang Xiaotao (Chongqing).

In 2015, Hu Zhen and artist Yang Fan jointly created the "You Me Space". The Power of Image: The Xiaozhou Dynamic Image Project "is the first art experimental project planned by" You Me Space ". This project is based on the Xiaozhou Auditorium and showcases the visual works of numerous contemporary artists both domestically and internationally according to different themes, continuously 365 days a year. To explore effective ways for contemporary art, especially visual art, to spread beyond the space of art museums and galleries. The penetration of contemporary art into daily life, as well as the impact and changes it brings, is evident in the persistence day after day.

On December 6th, Zhang Ga planned the exhibition "Song of Generation Y" at OCAT in Shanghai, which showcased the video installations of Guo Xi, Zhang Jianling, Lin Ke, Miao Ying, Shen Shen, and Ye Funa.

December 27th: The 12th China Independent Imaging Exhibition closed on December 27th. This year's film exhibition received over 400 registered films, with 67 films ultimately nominated. During the film exhibition, more than 40 screenings were held, with over 1000 viewers registering to watch. Due to objective conditions such as time and venue, some of the shortlisted films were not screened. We deeply apologize to the authors of this section.

2016

In July, the Central Academy of Fine Arts Art Museum collaborated with Michigan State University's Bro Gallery to jointly plan the "Time Test: International Video Art Research and Observation Exhibition". This project will take the development of video art as the axis, and present the video works of over 60 Chinese and foreign artists in two parts that complement each other - "Moving Time: 50 Years of Video Art, 1965-2015" and "Screen Testing: Chinese Video Art Since the 1980s".

The "Technical Ethics" themed exhibition at the Beijing Media Art Biennale from October 1st to 2nd was exhibited in the underground exhibition hall of the China Century Monument Art Museum and the Central Academy of Fine Arts. The curators were Bernd Kracke, Su Xinping, and Song Xiewei; Curator team: Anita Beckers, Chen Xiaowen, Jin Jun, Fei Jun, Wang Chunchen.

October 13-16: Gravitational Wave · The Fifth China Independent Animation Film Forum received a total of 592 entries, including works from Japan, South Korea, the United Kingdom, the United States, Singapore, Germany, the Netherlands, Israel and many other countries in addition to Chinese Mainland, Hong Kong, Macao and Taiwan. This forum has six awards: Forum Award, Forum Fund Award, Jinmin Award, Student Works Award, Special Award, and Jury Recommendation Award.

From December 10th to December 15th, the SIMPLIFYING BELIEF ROUTINE Easy Faith Channel will redefine the relationship between Buddhist art and fashion by combining clothing, installations, and 3D imaging media. Experimental music and scent also create a rich spatial experience together.

Exhibition location: 361 Xinfeng Road, Jing'an District, Shanghai; Curator: Su Zuo; Exhibiting artists: JXXX, Great Compassion Universe.

December 16th (Friday) 16:00 2016 Shenzhen New Media Art Festival: "South: Iteration: Gravity", exhibition location: Shenzhen Exhibition Hall G&G Creative Community, Shekou Huigang, curator: San San De. This time, we propose the concept of heterogeneity sustainability in response to the concept of "South". The diversity of Shenzhen's multi block culture, the diversity of the majors and sources of participating artists, and the changes in their iterative updates are recorded here. This time, the city will serve as an experimental venue, and the system and site will serve as a medium and interface. The artist community will arrive at the three major exhibition venues in batches at different times to present the entire content of the 2016 Shenzhen New Media Art Festival "South: Iteration: Gravity".

2017

On January 14th, "Seeing is Void" | New Media Art Exhibition: Hot topics are not cold, and art is thriving. A new media art themed exhibition was held at the Art Museum of the Central Academy of Fine Arts. The event was planned by Mr. Shi Guanzhe and invited five artists from different art schools and works to participate in the exhibition, including Deng Dafei, Fu Shuai, Ma Liang, Xia Xia, and Zhang Jing. Wang Huangsheng, the director of the Art Museum of the Central Academy of Fine Arts, and Ren Jian, the dean of the School of Art and Design at Dalian University of Technology, attended the event.

From January 21st to April 14th, Juchang - Transformed Media Art Exhibition will be held at the 1st to 3rd floors of the Shanghai Contemporary Art Museum, curated by Yang Qingqing. This "Juchang Transformed Media Art Exhibition" is based on the concept of "Transformed Media" proposed by Yang Qingqing in 2010. Through the collision of artistic ideas, the superposition of innovative energy, and the enhanced objectification of human synesthesia, visual and auditory senses, tactile and olfactory senses, physical and virtual senses cross each other Entanglement. With the rapid evolution of technology itself, the practice of media art has broken through the inherent forms of artistic expression and continuously updated its content, resulting in a new form of contemporary art.

On October 29th, the "Unknown Future" new media art exhibition was held at the NIU Art Space in Shijiazhuang, Hebei. Curator: Fu Lai Cangxin, exhibition planner: Niu Heyin, Liu Yunqi, Fu Lai Lv Tong, art director: Zhang Zikang, academic committee: Cao Kai, Peng Fengji, Shaofeng, Zhang Haitao, Zhu Zhu.

On November 4th, the first "China Hechuan Fishing City International New Media Art Festival" opened at the original Heavy Cotton Fourth Factory. This year's art festival attracted 516 artists from around the world, including the United States, France, Germany, Japan, South Korea, Austria, and India. After carefully selected by top international art masters, the works of 100 artists were exhibited on-site. The theme of this art festival is "Return", jointly planned by Wang Chunchen and Zhang Xiaotao.

The Second Longli International New Media Art Festival was held from November 8th to November 12th in Longli Ancient City, Jinping, Guizhou Province.

On November 25th, Lumen Matrix - International New Media Art Exhibition was exhibited on the 2nd floor of Museum 2 of Today Art Museum, curated by Wang Yan.

On December 9th, at the Liangzhu Cultural and Art Center in Liangzhu Cultural Village, Gu Zhenqing and Zhang Haitao planned the "Urban Nomad" 2017 Hangzhou Big Roof International Dynamic Image Exhibition, which gathered a large number of international art experimental images from both domestic and foreign exhibitors.

2018

On July 8th, the Ivy League Plan 2018 media conference was officially held, and the exhibition theme of the Ivy League Plan 2018 was "Immortal City, Eternal Life". The annual exhibition is curated by Kang Jianfei, an associate professor at the Printmaking Department of the Central Academy of Fine Arts, and Sheng Wei, the deputy editor in chief of the magazine "Fine Arts". Wang Lin, Song Zhenxi, and Su Lei, the emerging talents of the China Youth Cure Exhibition, are curators.

From October 28th to November 21st, the Holographic Writing 2018 International Cross Media Art Exhibition, hosted by the China Academy of Fine Arts and the Beijing Times Art Museum, and organized by the Cross Media Art School of the China Academy of Fine Arts, was exhibited at the Beijing Times Art Museum.

The fourth International Cross Media Art Festival is planned by Yao Dajun, Vice Dean of the Cross Media Art School and Director of the VirREAL Art and Technology Center. The theme of this 2018 Cross Media Art Festival is "Holography", reflecting on the experiments and innovations made by cross media art in media expansion and media travel through a large number of post creation settings. The special performance of "Beijing Sonar 15th Anniversary" reviews and pays tribute to the development process of domestic media art. The art festival covers aspects such as virtual reality, concepts and objects, machines and bodies, and image survival, attempting to showcase a cross media "holographic" creative concept.

From December 21, 2018 to March 10, 2019, The theme exhibition of the 6th Guangzhou Triennial Exhibition, OCT Box Art Museum, is "Sincere Thinking: Accelerating the Future", and the public art section is "Symbiosis of the Future" The opening ceremony was held at the OCT Box Art Museum. Sponsored by Guangdong Art Museum and OCT Box Art Museum, co hosted by Daliang Cultural Center, curated by Wang Shaoqiang for the overall planning, literature exhibition, and public art section, and curated by Angelique Spaninks, Zhang Ga, Philipp Ziegler for the theme exhibition. Exhibiting artist: Dorian Gaudi Dorian Gaudin, Tom á s Saraceno, Ief Spincemaille, Jiang Zhuyun, Liu Jiayu, Fan Bo, Zhou Li, Shen Lieyi, Jin Jiangbo, Liu Ke, and Fang Qi.

2019

On March 22nd, the Yundai Blue Prize 2018 award-winning exhibition "Quasi Nature - Biological Art, Boundary and Laboratory" was curated by Wei Ying. This exhibition will focus on "Biological Art" as the main theme, and the first part will showcase classic works in the history of biological art, exploring aspects such as bioethics, technological boundaries, and self-awareness; The second part will showcase themes related to microorganisms and plants, reflecting on how humans and other species interact in the present; The third part, "Laboratories as Surprise Generators," investigates famous laboratories with "artist residences" worldwide, with the aim of asking: can artists' creations transcend studios and public spaces and enter other professional fields such as technology laboratories, thus generating another paradigm shift? This is also very enlightening for the development of biological art and even technological art in China.

From August 10th to November 2nd, "MOTSE Mozi: Over and Over Again," an immersive new media art group exhibition featuring 17 immersive interactive new media artworks by the international new media art team, MOTSE Mozi, is a borderless art fantasy party organized by Shenzhen Nao Art Technology Co., Ltd. and Shanghai Baolong Art Museum. The venue is Hall 8 and 9 of Baolong Art Museum.

From September 28, 2019 to January 5, 2020, "Growth" will be presented at the Zhi Art Museum, showcasing the works of eight artists/artist groups from five countries. Under the filter of technological fantasy, it will further analyze the strange and restless boundaries between life and growth, as well as the boundaries between living and subconscious, foreshadowing a future that is both fascinating and unsettling. This exhibition is jointly presented by the Zhi Art Museum and the New Times Media Art Center (CAC). Curator: Zhang Ga.

On November 6th, "Brain Cave - Artificial Intelligence and Art" was exhibited at the Ming Contemporary Art Museum, curated by Qiu Zhijie and Long Xingru. (Exhibition Passed through 22 Groups）Artist, 28 avant-garde artworks showcasing and exploring the infinite possibilities of combining "artificial intelligence" and "art".

On November 17th, the themed exhibition "Performance of Things - Scientific and Artistic Views" will be held in a preview at the China Hotel on November 17th. This exhibition will be jointly produced by Future Forum and Xichun Art Education Public Welfare Foundation. The exhibition is curated by renowned curator Gu Zhenqing, with renowned curator Huang Du serving as a consultant. Five future science award winning scientists, including Lu Yuming, Xue Qikun, Pan Jianwei, Xu Chenyang, and Ma Dawei (in chronological order of the time when scientists won the Future Science Award), and five famous contemporary artists, Chen Wenling, Fei Jun, Li Hui, Wang Du, and Yang Qian (in alphabetical order of their surnames), created together in one-on-one groups.

On November 30th, the annual art exhibition "Total Time" organized by Pingshan Art Museum kicked off at Pingshan Art Museum. Organized by renowned curator Li Zhenhua, artists such as Xu Wenkai, Hu Jieming, Lv Shengzhong, Qiu Zhijie, Barbara Siegner, Mike Bodemann, Roman Siegner, and Wang Jianwei were invited to participate in the exhibition.

On December 30th, the exhibition "Post Life - Art and Technology in the Intelligent Era" organized by the Central Academy of Fine Arts and Sichuan Academy of Fine Arts opened at the Chongqing Contemporary Art Museum. This exhibition, as one of the series of touring exhibitions of the "Post Life" Beijing Media Art Biennale (BMAB), has been held in Suzhou, Shanghai and other places since its first exhibition at the Art Museum of the Central Academy of Fine Arts in September 2018.

2020

August 6th: The 2020 Global Artificial Intelligence and Robotics Summit (CCF-GAIR 2020) was held in Shenzhen, with the theme of "AI New Infrastructure, Industry New Opportunities". The conference includes AI Frontiers, Robotics Frontiers, Frontier Voice Technology, Federal Learning and Big Data Privacy, AI Chips, Intelligent Driving, AIoT, Smart City "New Infrastructure", Enterprise Services, Industrial Internet, AI Finance, Visual Intelligence City IoT, Medical Technology 15 AI special sessions including AI+Art and AI Source Creation. A special commemorative event for Huang Xutao, the father of computer vision, was also held. We also held a whale rhinoceros event aimed at providing new ideas for enterprises to transform and upgrade in the intelligent era × Tencent's "Thousand Sail Plan" Digital Industry Salon.

From September 26th to November 22nd, the Asia Digital Art Exhibition, with the theme of "World Processor", invited artists and art teams active in the field of digital art from both domestic and foreign countries to use digital technology to provide new interpretations of Asian civilization and Chinese culture. Through reinvention in the digital world, it brought a wide range of sci-fi imagination to the audience, and sorted out and formed a digital civilization view with inheritance and innovation of the times, Lead the audience to explore the mysterious and unknown digital world together. Exhibition location: Beijing Times Art Museum, curated by Qiu Zhijie and Chen Baoyang.

On October 31st, the 6th Cross Media International Art Festival of "Near Future: Possible Life" in 2020 opened by the Dongqian Lake in Ningbo. The exhibition period of this art festival is ten days, consisting of two exhibition areas: "Hanling Exhibition Area" and "Zhang Yonghe Architectural Art Exhibition Area of

Dongqianhu Education Forum", as well as six exhibition modules: "International Cross Media Art Invitation Exhibition", "International Youth Image Exhibition", "Wormhole Log" Image Exhibition, "Fireworks Planet" Installation Exhibition, "Consciousness Circle" Open Media Exhibition, "DISEGNO" Cross media Giant Structure, and international academic seminar. Academic host: Guan Huaibin, curator: Gao Shiqiang, Mou Sen, Yao Dajun.

On November 21st, the XR (Extended Reality) exhibition "Debate: Identity" opened at the 798 Space of Goethe College (China) at the German Cultural Center in Beijing. The exhibition is jointly planned by German curator Lars Lumel and Chinese curator Che Lin. The exhibition includes six works, including interactive VR (virtual reality) works, MR (mixed reality) works, and VR films, all of which focus on identity issues.

On December 4th, the exhibition "Empathy · Connection" was held at the Beijing Times Art Museum. The intention is to explore the connection between humans as a "community of shared destiny", individuals and individuals, individuals and groups, humans and technology, humans and nature, art and life, and the present and future. Exhibiting artists include Chen Tianyi × Hu Xiaochen × Qi Mengjie, Cui Yi, Fei Jun, Geng Xue, Huang Xiaoqian, Jiang Xiaran, Li Ge, Niu Wenbo, Su Yongjian × Yin Guang, Wang Lei, Zhang Muchen, and Feinaqi Animation Group.

On December 24th, with the theme of "Digital Media Art and Technology", the second International Digital Media Art and Technology Conference was held in Beijing, organized by the Beijing Film Academy, the Engineering Research Center of the Ministry of Education for Digital Film and Television Animation Creation, the School of Digital Media at Beijing Film Academy, the Future Laboratory of Tsinghua University, and the Geek Laboratory of Peking University. It was co organized by the MANA Global New Media Art Platform. More than 50 interdisciplinary experts, scholars, and industry elites from both domestic and foreign countries such as the United States, Canada, Canada, and Australia. Conduct in-depth discussions around the creation and expression of digital media art, as well as the development of art and technology in the field of digital media. The guests unanimously believe that the development of digital media art and technology, from future imaging to immersive drama, from artificial intelligence to virtual reality, will profoundly affect the future

world and provide new annotations for the development of human society. (Summary of New Media Art Events)

4.1.3 The Development Path and Current Situation of New Media Art in China

Since the 1980s, the theoretical research on new media art in China has gone through a process of tracing phenomena, discussing categories, and constructing theories. It is developing from a spontaneously dispersed research stage to a consciously integrated research stage. At present, the overall characteristics of China's new media art and its theoretical research should be the research focus, and the main topics should focus on theoretical categories such as "object methods", "development laws", "artistic forms", "ethnic characteristics", and "disciplinary construction", emphasizing the research methods of disciplinary integration, multi-dimensional comparison, and "creation appreciation criticism research" interaction. Since the late 1990s, contemporary new media art in China, represented by video and online art, has gradually stepped out of the single stage of technological exploration and conceptual experimentation and turned into an individual's artistic response to society. However, criticism of new media's "low technological content", "circle oriented", and "congenital underdevelopment - imitating television and movies (especially single screen videos), lacking a unique language model" is still ongoing. New media not only provides humans in the digital age with another means of observing themselves from within, but also exacerbates the sense of loss between the real and virtual worlds. Moreover, the technology on which new media art relies still faces the danger of re forming a dominant ideology.

The difference between new media art and other types of art is not significant, but rather a creative process. Contemporary artists can use any tool or method to create art, and should not use too many concepts to distinguish artists. Nowadays, artists are searching for new ways and breakthroughs in traditional creative methods. In the era of rapid technological development, artists have seized everything and applied it to their own works.

The development path of Chinese new media art, from imitation to innovation in artistic methods, from imitation to originality, fully conforms to the general laws of artistic development. The practical process of new media art in China is a process from imitation to originality. This imitation includes two levels: imitation of

traditional art and imitation of excellent new media art from abroad. Chinese new media art takes imitation as its starting point. Although it is an emerging art, it does not necessarily mean abandonment of traditional art. Chinese new media art is adept at drawing nourishment from traditional art styles such as movies, paintings, sculptures, architecture, and photography to construct its own artistic language.

Wang Jianwei, an early new media artist, started working on Video in 1994 and was skilled in transforming regional experiences and historical allusions into contemporary issues. In 2000, he took the lead in attempting multimedia drama, promoting the development of new media towards a comprehensive "overall art" of multiple technologies.

He once said in an interview that multimedia art is only expressing a voice, targeting monopolistic discourse that stubbornly adheres to binary opposition. For example, since the May Fourth Movement, it has been one movement after another, and there is often an absolute confrontational relationship between the preceding and following movements. In fact, this absurd game where previous activities determine the fate of future generations should have stopped long ago: it restricts our in-depth exploration of the problem. In my opinion, multimedia art emphasizes a relationship and correlation, which is also what sets it apart from other arts: it is not only a personal attitude, but also a methodology. (Prospects and Situation of New Media Art in China2022)

Wang Jianwei also pointed out that new media art is still in a contradiction with our society. Strictly speaking, the concept of new media comes from an external experience. But the relationship between Western new media artists and the sponsorship system is relatively benign, while in China, the government or enterprises cannot establish a long-term stable relationship with multimedia artists. There may be one or two exhibitions or art festivals, but they are mostly one-time. In the previous paragraph, real estate companies seemed to establish a certain relationship with contemporary art, but in the end, it still became a warm propaganda tool for them. The current internal issue in new media creation is: artists should think, why do you choose the "multimedia" approach? Do you have a strong personal ideology? Is there a direct relationship between your concept and "multimedia"? After all, the knowledge content of each medium has its own scope and limits.

（1）The Cultural and Economic Values of Touch Designer in the Present Era

Touch Designer art was formed in a diverse context, especially now. Touch Designer art is not only a combination of science and art, but also connects traditional art with the art of the new era. On the basis of integrating the essence of traditional art, this art integrates advanced technology into it, so that its unique artistic language can be reflected in a new situation. Touch Designer art is important for today's art practice and programming process to be presented through this advanced means, using advanced technology as a new artistic language. Touch Designer art, as a carrier of contemporary art, can accurately reflect the characteristics of modern art, such as information density, spatiotemporal shortening, and enhanced group influence. With the continuous emergence of new technologies, Touch Designer art is also constantly developing. It is no longer an art form, but gradually becomes a bridge between people and information, becoming an irreplaceable part of contemporary culture. In order to better grasp Touch Designer art and give it new connotations, people also need to connect it with the world. With the development of technology, the artistic means of new media will become increasingly advanced and closely linked to people's daily lives. In the future of Touch Designer art, culture will become the focus of people's communication. Only by organically combining the real and virtual worlds can the artistic functions of Touch Designer be fully utilized. In the new situation, it can make people more interested in Touch Designer art, and on this basis, they can repeatedly ponder and choose and interpret it with their own unique insights. Touch Designer art is influencing people's behavior and thinking in a new way. In the process of development, it not only enables effective communication between art and other fields, but also promotes the development of art towards popularization. With the continuous development of new technologies, Touch Designer art will penetrate into a wider range of fields, not only affecting the art field, but also affecting other fields.

1.1 The connection between the humanistic value of Touch Designer and new media art

Intersection in connotation and relative independence of disciplinary system

The current world is a diverse one, where different carriers can be integrated together. Science and technology are quite important in our lives. When these two concepts work together in my life, the boundary between science and art becomes somewhat blurred. However, humanistic and technological concepts seem relatively harmonious in this era. However, with the development of technology, the boundary between humanistic and technological concepts will become increasingly uncertain. Touch Designer technology not only brings convenience to us, but also highlights the issue of uncertainty. It is important to clarify the concepts of art and science and not confuse them. Only by clearly distinguishing the concepts of the two, constantly paying attention to new trends in technology, and continuously mastering advanced technology, can we create updated and better works with solid humanistic basic skills.

1.2 The two blend and promote each other's development

This is mainly reflected in the fact that only by incorporating human concepts and unique ways of thinking can a work of art be considered a true artistic creation. Relying solely on technology to improve it is a relatively empty and soulless work. Touch Designer art is the process in which an artist, after determining their own style, expresses it through traditional artistic means, and then processes it with technology to form artistic creation. It is the art of re creation, for example, contemporary dance art is performed by dancers in the most traditional way, and then preserved through television cameras. While meeting the influence of the real public, it can also inspire future generations. It breaks the traditional art based on calligraphy, painting, and murals, and adds modern technology to the foundation of traditional art, making dance art more intuitive and authentic. The arrangement of dance is a product of the artist's personality and thinking, emphasizing the humanistic concept of creation. And television media showcasing dance art in new forms can make dance art more lively. Therefore, traditional art and Touch Designer art complement each other and are a unity of humanistic concepts and technology. If an artist only creates traditional art without using advanced technology to process and modify it, then this art can only be called art. If it is simply a pursuit of technology without the unique thinking activities of artists, then art can only serve as a means of expression and lacks humanity. In Touch Designer creation, humanistic and technical concepts are an inseparable

organic whole, and they also influence and interact with each other. Only by integrating traditional art and new technologies can new media art develop better.

（2） The humanistic value in new media art

2.1 The embodiment of humanistic value in the art of New Touch Designer

True art is the combination of thinking and technology. The creation of artistic works contains unique human thinking, which is the true artistic creation. Art creation that is only completed in the form of technology is not true art. Only by combining art and thinking can we better interpret new media art. For example, in the 16th Guangzhou Asian Games in 2010, Touch Designer art was used. The relevant situation of the Guangzhou Asian Games was conducted through on-site interviews with reporters, and information was processed through network technology. Finally, Touch Designer was used as a medium to build a virtual online studio and spread it to the public, truly achieving one person, one media. Broadcasting news and information dissemination through the internet not only has a wide range of information sources and diverse postures, but also can quickly and timely spread globally. In addition, when there are problems with this information dissemination pathway, it can be modified in a timely manner. This Touch Designer technology not only enables people to better understand the situation related to the Asian Games events, but also improves media dissemination efficiency. At the same time, it can combine artistic creation and technology, interpreting the value of new media art.

2.2 Aesthetic and humanistic values in new media art

With the continuous development of new media technology, China has entered the era of mass cultural media. In the new era of economic globalization, cultural resources are being allocated across regions and cultural works are being marketed across fields, which has led people to pay attention to aesthetic values in daily life. People often integrate the market and consumption mechanisms into the fields of aesthetics and art. In the new era, the evaluation of literary and artistic works is not only the responsibility of a few experts and scholars, but also the right of the general public to participate in the evaluation. For example, the ratings of TV dramas and movies disseminated through new media art require the participation and objective evaluation of the public in order to achieve high or low ratings. However, in the process of evaluation, it is necessary to be moderate. Only by having a clear

understanding of culture and objectively evaluating it can true aesthetics be achieved. Taking Taoism as an example, what Taoism pursues is a beauty that transcends reality and is not based on human consciousness. Taoism believes that the beauty of the present world is limited and does not care about beauty or ugliness. Only the pursuit of true beauty that is not based on one's own will is eternal beauty. From this, it can be seen that the aesthetic values of Taoism are based on simplicity and no modification. Today, with the popularization of daily life aesthetics, the aesthetic perspective should no longer focus on the surface of things, but should progress towards a deeper level.

Table 2 Time line
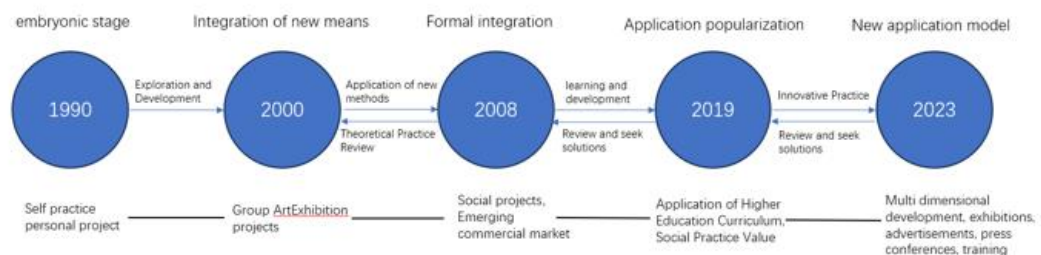
4.2 Study the current application status and problems of TouchDesigner in China

4.2.1 The current application status and problems of TouchDesigner in China

The numerous characteristics of Touch Designer's installation art have created its unique economic and social value, which can inspire the development of advertising, architecture, landscaping, display design, gaming industry, and other aspects in terms of economy; In terms of society, it has functions such as spreading public welfare ideas, beautifying the environment, shaping the image of cities and even the country.

（1）New media devices as advertising media

The demand characteristics of Touch Designer installation art itself - the cutting-edge and fashionable technological connotation McLuhan's exclamation - 'The medium is information', the truly valuable 'message' is not the content of

communication in various eras, but the nature of the communication tools used in this era and the possibilities it creates. New media devices themselves possess fashionable and novel qualities, which have unparalleled advantages in shaping the brand image of a product or service compared to other media. A brand has a certain "symbolic meaning" in the minds of consumers, and advertisements that use Touch Designer to install art themselves convey a message to consumers - this brand is cutting-edge and has technological connotations, just like rice paper itself carries a sense of elegance and elegance. However, it should also be noted that the Touch Designer device still has a lot of room to play under different shapes. It is envisioned to combine rice paper, mirror surface, and dim yellow light and shadow, and its work personality may be mysterious and ancient. In 1997, a San Francisco real estate developer... he asked local artist Gogan to create an exhibition installation called "Throw Out the Window" (Figure 2) in an empty four story building on an indoor street corner, and sponsored a cultural performance carnival in front of the installation. Because he didn't forget, on the wall of the installation, he wrote in the style of a "graffiti" artist, 'This house is for sale, with a 130 foot facade.', The fax machine number is... 'His unsold building has gained a great reputation. This successful case of using installation art for marketing has brought many inspirations to the advertising of new media installation art. This is like using "stories to connect products and consumers, so all products have the nature of object language" to carry out "object language marketing" by personifying furniture. The work "Contact Me" (Figure 10), also from the "Synthetic Age" exhibition.

Figure 8 Contact Me

Source: https://www.artron.net/

Participants must be close to frosted glass in order to initiate a photo shoot, and the audience usually exhibits extraordinary and unique expressions of surprise and joy - which is precisely the marketing appeal required by certain brands. Artists can also create derivative artworks by retaining and displaying the images of these participants.

Compared to traditional advertising, some Touch Designer devices require higher installation and maintenance costs. Not only do we need to consider maintenance costs, but we also need to consider preventing theft.

（2）Analysis of Advertising Placement Positions for Touch Designer Devices

The placement and effectiveness statistics of outdoor advertising have always been a challenge in advertising studies. The author hopes to introduce theories from economic geography to explain the placement and dissemination scope of Touch Designer installation art.

The central location theory is a type of urban location theory that explores the optimization of urban systems when studying urban spatial organization and layout. It was proposed by German geographer Kristal after extensive investigation and research. The central area mainly provides trade, finance, handicrafts, administration, culture, and spiritual services, with corresponding service scopes (upper and lower limits) and hierarchical nature. For example, large shopping malls, medium-sized supermarkets, and small shops are three different levels of central areas. The spatial distribution pattern will be influenced by the three principles of market, transportation, and administration. The number and distribution of central areas are inversely proportional to their level, and the service scope of central areas is directly proportional to their level. A hexagonal chart (Figure 5) is used to summarize the relationship between urban level and scale. This theory has many assumptions and prerequisites, and many practical conditions need to be added in current urban planning operations to be applied. However, it still has certain reference significance for studying the placement of new media device advertisements.(Interactive Visual Art 2022)

I believe that Touch Designer device advertising has the same nature and is also influenced by the three elements of transportation, market, and administration.

The distribution of its recipients (equivalent to consumers in the central location theory) also has a certain range, which I will temporarily refer to as the scope of dissemination (equivalent to the service scope in the central location theory). But because it does not provide a certain product or service, in other words, people do not go to see new media installation art like they do to other centers, so it is very different from the center:

2.1 Touch Designer installation art does not involve the concept of economic distance and other original centers because it is not a commodity. The market has little influence on it, and transportation and administration have become the main factors affecting its distribution. And due to their personal participation, transportation is mainly influenced by public transportation such as subways and buses.

2.2 The author speculates that if the Touch Designer installation art advertisement is located at a gathering point of public transportation, such as subway transfer points, bus terminals, the construction of large shopping malls based on the principle of optimal transportation, etc., its dissemination range should be radial, with a star shaped decreasing distribution along the main transportation roads; If it is located in a non public transportation gathering place, such as a shopping mall or medium-sized park based on the principle of market optimization, its dissemination range should be the same as that of the central location - in a hexagonal distribution.

2.3There is no substitutability between different Touch Designer devices, that is, unlike large and small hospitals that can provide simple medical treatment services. People watching and participating in a certain device does not affect their participation in other installation art. However, for the same installation art advertisement, it is another matter. They will relatively follow the principle of centrality, with overlapping and complementary dissemination scope.

2.4 Touch Designer devices form a cluster and become a place to provide some kind of artistic entertainment, then new media installation art also has a certain level of hierarchy. Large scale and large quantity device clusters have a larger dissemination range, while small scale and small quantity device clusters have a smaller dissemination range.

The central location theory here is equivalent to studying the "triple minimum" and "pulse type" placement theories of television advertising exposure,

providing an effective theoretical basis for the idealized placement of installation art advertisements.

4.2.2 Touch Designer Matrix Device as Architectural Decoration

Manhan Technology relies on core technology and industry resources to achieve project landing for specific application scenarios. At present, products and services in the fields of robotics, installation art (floating ball matrix, etc.), and smart cities have been widely applied in scenarios such as smart city construction, industrial Internet of Things, technology exhibition halls, commercial complexes, and large-scale event exhibition areas.

The magnificent floating ball matrix is sometimes as static as a virgin, sometimes as dynamic as a rabbit; The dancing posture up and down seems like a skilled dancer dancing gracefully on the piano, creating dynamic sculptures of various shapes through changes in lifting positions and flickering lights, shocking the audience.

Figure 9 The magnificent floating ball matrix

Source: http://www.touchdesigner.co/

This is the floating ball matrix that has emerged in recent years. The floating ball matrix is a multimedia device that combines machinery and art, and is an immersive multi sensory interactive carrier that can provide people with a stunning visual experience. Under the operation of Touch Designer, the floating ball matrix integrates various disciplines of technology such as motion control, servo technology, mechanical structure, computer programs, graphic pixels, visual art, and music expression. Under the control of a computer, hundreds of small balls move in an

orderly manner, achieving various changes in three-dimensional graphic effects. It deduces various dynamic shapes such as curves, surfaces, planes, text, and 3D patterns, and the overall effect is like a flowing and colorful three-dimensional painting. It is a perfect combination of technology and art, and the combination of lighting and sound brings visual and audio-visual impact to the audience.

Figure 10 The combination of lighting and sound brings visual and audio-visual impact

Source: http://www.touchdesigner.co/

The floating ball matrix combines the latest technological presentation with art to showcase the charm of cross media applications in multiple fields, including stage performances, brand events, and exhibition displays, allowing the audience to enjoy the light and shadow feast brought by music, visual, and interactive art.

The Floating Ball Matrix series created by Manhan Technology is a redefinition of material, material, and spatial scenes, a re exploration of human circumstances and art in the digital era, and a redefinition of artistic expression forms.(TEA Community 2022)

Manhan Technology is committed to exploring the possibilities of new media applications in the fields of art, design, science, and technology. Relying on core technologies and industry resources, we aim to achieve project implementation in specific application scenarios: products and services in the fields of robotics, installation art, and smart cities have been widely used in smart city construction,

industrial Internet of Things, technology exhibition halls, commercial complexes, large-scale event exhibition areas, and other scenarios.

Research and analyze the impact of Touch Designer on Chinese media art at different times after its introduction to China, as well as the impact of using TD as a medium for creation on the form of works.

（1） Sound Visualization in Touchdesigner

The connection between human brains is a simulated effect, while the neural dynamics of music are a simulated representation of musical sounds. Simply put, sound is completely abstract and can be felt through "listening". If this feeling is transferred to artistic creators who are accustomed to image thinking, with the important ability of human "listening", they can infinitely generate illusory thinking while listening to music, and then generate illusory vision through this illusory position; Most artists usually have illusory visual abilities, visualizing and concretizing them to create the imaginative world of creators.
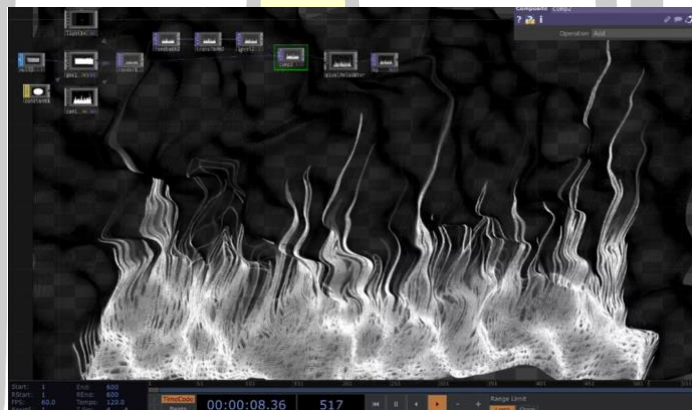

Figure 11 sound visualization training

source: Screenshot of one's own work 2022

This type of sound visualization training has been introduced to China by foreign scholars as early as the mid 20th century. In advanced teaching institutions in China, this teaching practice has even been applied to enrollment selection, testing candidates' ability to transform a feeling into visualization. For example, asking candidates to appreciate a song and then concretize their understanding of the song into a picture. The training of transforming illusory thinking into concrete visualization is helpful for the education and cultivation of students in the future. This

cultivation helps to express synchronous insights, such as in 1995 when Hayao Miyazaki painted a 6-minute music video for "Chuck and the Flying Bird" in "On Yourmark". The visuals are like Hayao Miyazaki's interpretation of environmental issues, and the elements of the song are combined with the visual visuals of the animation. Due to the rampant nature of animation, the audience has added a layer of imagination, and such music, songs, and animations are applied in many places. This example of sound visualization is quite typical, where animators interpret music after listening and concretize it. Although animation has its limitations in music rhythm, due to the infinite imagination of animation, the design of character actions and visual thinking of the screen will be different from the general realistic situation.

The main components of music include rhythm, melody, speed, and force, which are one of the main conditions for students to understand music in animation classes. From an artistic perspective, music is temporal and dynamic, and its temporal and dynamic nature is reflected through rhythm. Rhythm is an important language of music, the backbone of music, and the foundation of music. Therefore, when appreciating music, one can grasp its rhythmic characteristics to guide students to understand the music image. [1] For example, when appreciating the erhu song 'Horse Race', students can capture a rhythm similar to running and inspire them to imagine the scene of a galloping horse on the grassland through listening, clapping, and speaking. Thus, students can extract and produce imagery in an abstract sense.

From the perspective of melody, melody is the language of human expression in music, the soul of music, and an important factor in shaping the image of music. The rhythm of music, combined with beautiful melodies, gives it a moving element. Therefore, paying attention to guiding students to analyze the melodic characteristics of music in teaching can help students more accurately grasp the music image. For example, Chopin's piano work "Raindrops" can be divided into several segments based on the ups and downs of the music at first, and then guide students to imagine the melodies that rise and fall one after another to find a sense of artistic conception and realism in the picture.
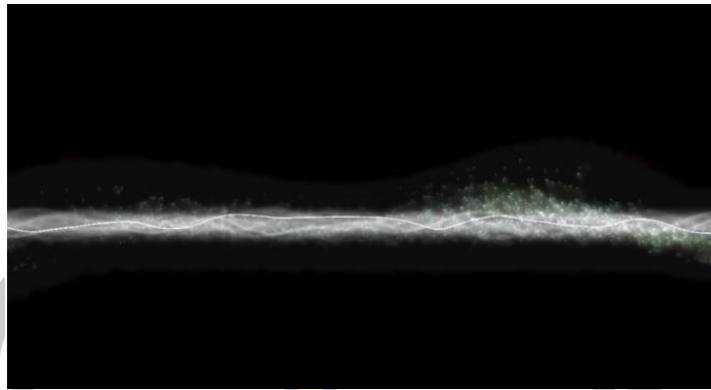
Figure 12 Raindrops

source: Screenshot of one's own work 2022

From the perspective of speed: The speed of music directly affects the style, characteristics, and basic image of music. Regardless of the type of music, the speed determines its important characteristics, which are lyrical, passionate, and quiet. The effects of different speeds are different.

Analyzing from the perspective of intensity: Changes in intensity can make the music image to be expressed more vivid and vivid. The magnitude of the force directly determines the scene of the music being listened to. In this way, students can gradually appreciate the music from the perspective of its structure, and the classroom atmosphere will shift from low to active and orderly. Students can also learn their own understanding and feelings of music more accurately. (TEA Community 2022)
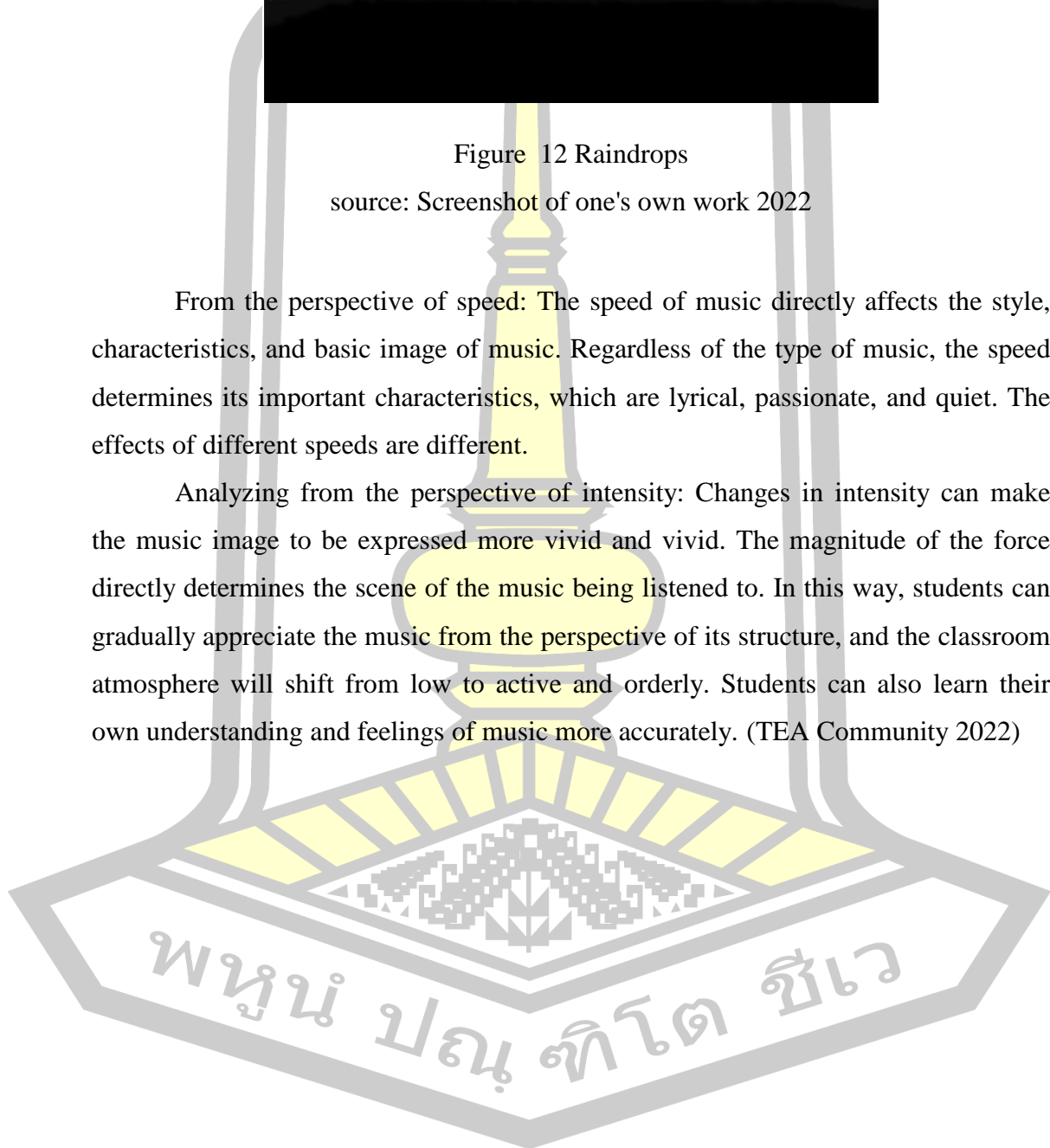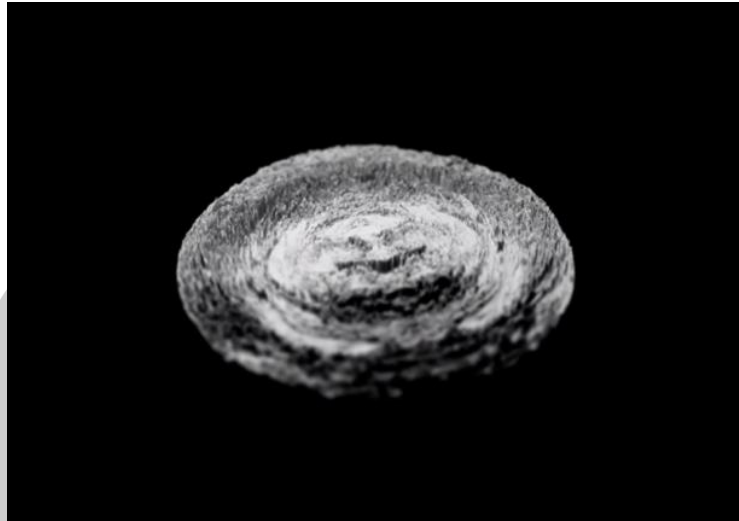
Figure 13 sound

source:Screenshot of one's own work 2022

The creation of the British anime series The Qui Brothers relies heavily on the inspiration of music for the theme and influence, combining real-life effects with objects or puppets. The style is unique and surreal, with no dialogue in the film. The light, dynamics of objects, and movement of the camera are all considered as notes for creating musical melodies, giving a strong sense of music to the influence. This is also the application of animation to visualize music.

Visual Soundization

The visualization of sound or the visualization of sound are not imagined out of thin air. The former relies on music for psychological experiments, while the latter uses images to verify. In terms of the relationship between sound and influence on human perception, in 1938, Eisenstein fully discussed the relationship between music and visuals with composers in his film "Alexander". He created a study of montage techniques, using music as an analogy and seeking help from some concepts of music, such as rhythm, off string sound, main melody, etc. For Eisenstein, each type produces a specific audio-visual effect.

The continuous dynamic images of the music industry and lines, geometric shapes, or tones are not difficult to associate with the visual effects of computer playback software. With the ups and downs of music melody and tone, visual effects such as particles, colors, and fragments are presented. There are specialized software

in the market that first processes each image on the syllable, and drives the image through the input of music, resulting in the appearance of music. These basic concepts were already experimented with by Oscar, the pioneer of experimental imaging in Germany. He shot a series of films using abstract graphics to concretize sound and fully deal with the impact and sound in a counterpoint manner. The combination of dynamic images with famous symphonies, music providing rhythm, and interaction with various abstract shapes creating fun, has made his film "Fantasia" popular due to its innovation and combination.

Artists use the real-time radio function and audio files in Touch Designer to form basic image elements, presenting music like rhythms through jumping and deformation.

Interactive Installation Art and TouchDesigner (Visual Design Tool)

Interactive installation art is a form of artistic expression that integrates modern technologies such as multimedia across borders, breaking through the single form of traditional art. It combines multiple disciplines such as biology, optics, physics, acoustics, psychology, information communication, aesthetics, and covers computer programming and animation production. At the same time, to enhance the interaction between the work and the audience, some sensing systems and output devices are also involved. The relevant hardware equipment and digital media materials are not only media materials for creation, but also tools for creation and dissemination. Through the intervention of digital media and digital technology, the interactivity of interactive installation art is stronger, and its presentation methods are also more diverse.
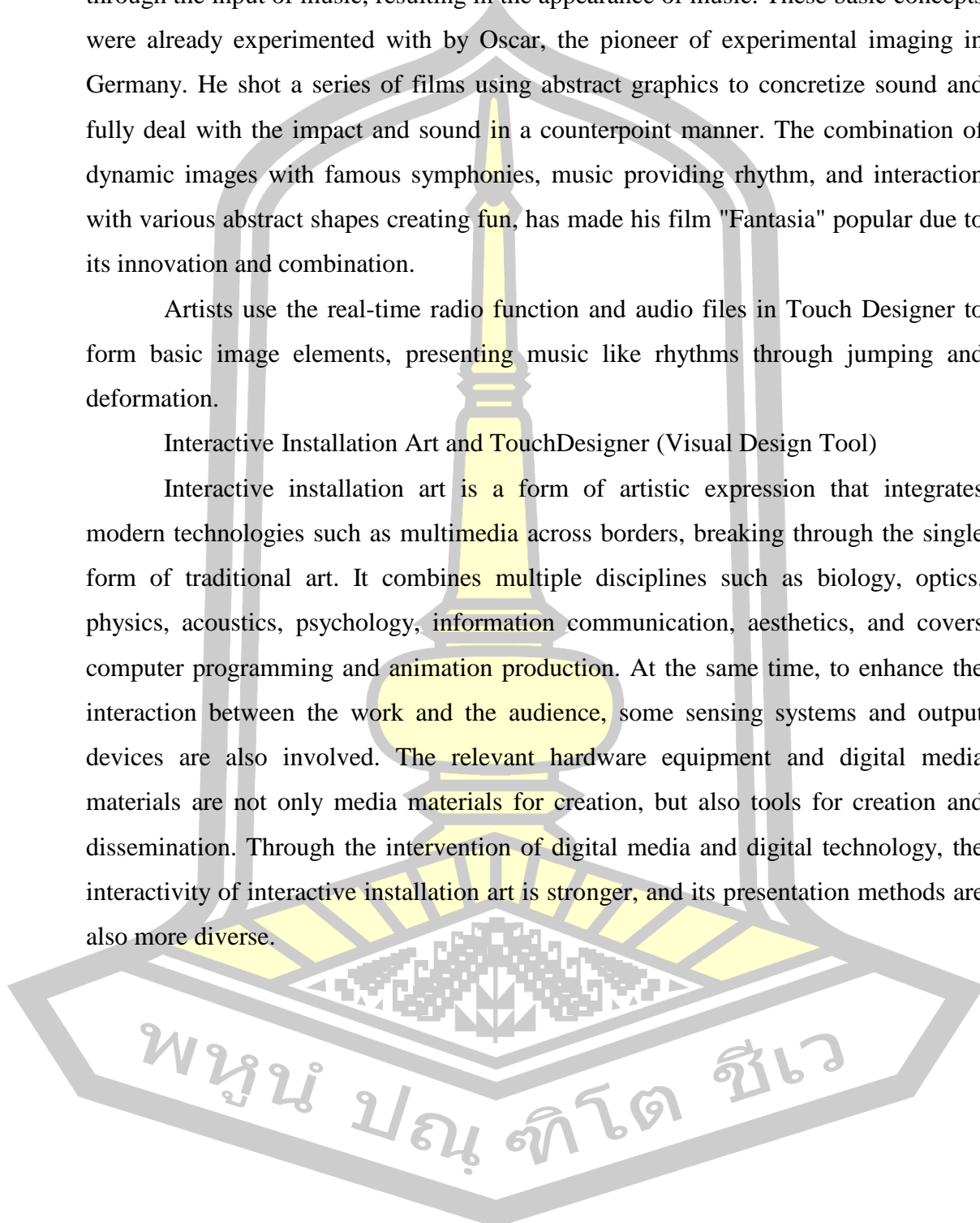
Figure 14 Interactive installation art

Source: https://zhuanlan.zhihu.com/

The birth of TouchDesigner provides a more efficient and convenient creation platform for interactive installation art. It is a node based visual creation software developed by Canadian Derivative company in 2001. Unlike traditional complex programming tools, TouchDesigner provides a new creative approach that utilizes visual nodes as a means of production. Users can use COMP (Components), TOP (Texture Operators), CHOP (Channel Operators), SOP (Surface Operators), DAT (Data Operators) Create six basic functional components of MAT (Material Operators). Throughout the entire programming process, the software transforms the structure and functions of the code into countless modules, and by arbitrarily dragging the controller to combine actions through wiring, the ideal creative effect can be achieved [3]. Creators and designers do not need to worry about low-level programming development, and can invest more energy in integrating different media devices to create more imaginative cross disciplinary new media works.

（2）Interactive installation art generated by TouchDesigner

2.1 Characteristics

As an implementation tool for computer-generated art, TouchDesigner's randomness is one of its main characteristics. The same program cannot produce the same effect, and the audience, including the author, cannot predict the final effect of the work, which endows the creation itself with endless possibilities. In addition, the

high interoperability, high integration, real-time, and data visualization features of TouchDesigner have led more and more artists and designers to abandon traditional standardized production tools and instead use TouchDesigner to create art works, commercial projects, and more.

2.2 Function

The combination of using Python (computer programming language) as an embedded programming language and AI (Artificial Intelligence) has given people more imagination about the most popular artificial intelligence created by TouchDesigner. The real-time control interface function of TouchDesigner allows it to be applied to various large-scale commercial projects and exhibition venues, and the high level of stability in the industry makes it adopted by various world-renowned studios and teams. The built-in TouchDesigner software includes hardware reading components such as Kinect TOP (3D Stereo Camera Image Component), Kinect Azure TOP (Spatial Computing Developer Kit Image Component), and RealSense TOP (Real Sense Image Component), which enables it to combine with various sensor devices to achieve human-computer interaction effects. In addition to directly reading peripheral data for communication, the rich protocol interfaces are also an important reason why TouchDesigner becomes omnipotent. It can integrate various environments based on different hardware facilities, hypertext transfer protocols, global wide area network systems, and software matching operation options.

2.3 Application Fields

Faced with the current ever-changing market environment, TouchDesigner's agile deployment and architecture have given it strong adaptability, especially in data processing, which can meet the diverse needs of modern digital media art works. More and more designers and artists are using TouchDesigner to complete their projects in interactive media systems, architectural projection, live visual and music performances, virtual reality It can be seen in multiple fields such as mechanical hardware control.

2.4 Perceived Experience

The application of TouchDesigner to create interactive installation art fully mobilizes the audience's perception and experience of obtaining information in five aspects: auditory, visual, taste, touch, and smell. The interaction between the audience

and the work achieves the best effect, fully demonstrating the bidirectional information transmission and communication between the audience and the author.

The TouchDesigner technical analysis model is shown in the table below. It analyzes and studies the characteristics and functions of TouchDesigner, as well as the professional fields currently implemented in the market using this software, providing reference for using TouchDesigner to design art works.

（3） The advantages and significance of using TouchDesigner to generate interactive installation art

Interactive devices are divided into database establishment, signal acquisition, signal processing, imaging processing, and other auxiliary devices. Signal processing is a key node in the design of interactive devices, and the output, input, and conversion of work signals require programming. Programming software is a necessary means to achieve interactive device works [4]. Compared to using programming languages such as AS3 (ActionScript 3.0, object-oriented programming language), C++(computer programming language), and Processing (graphic design language) to create interactive installation art, TouchDesigner's visual programming environment eliminates the need for designers to use traditional textual code, and highly integrated components make it easy for users with zero programming foundation to use [5], Extend rich visual creative effects on the constructed initial modules. Whether it's Arduino (open source electronic prototype platform), Kinect (3D motion camera), Leap Motion (motion controller) at the laboratory level, or professional level stage lighting, radar tracking, and human body capture systems, TouchDesigner's powerful data interface can seamlessly interface with them. The clear interface, convenient operation, and powerful API (Application Programming Interface) interface enable TouchDesigner to encourage new media artists to create more excellent interactive installation art works.

Innovative Application of 3 TouchDesigner Interactive Installation Art

.3.1 Innovative Application of TouchDesigner in Interactive Lighting Devices

With the rapid progress of economic strength and cultural construction, people's aesthetic experience requirements for art are constantly increasing, and interactive lighting installation art has entered the public's perspective in this context.

Interactive lighting installation art utilizes the language of light for creation. Unlike traditional art forms based on pure visual perception, interactive lighting installation art uses new interactive technologies as the medium, utilizing elements such as sound, light, and electricity to provide viewers with a dual perception experience of visual and auditory perception. This creates emotional resonance between works and viewers, enhances public participation, and endows artistic works with higher social value.
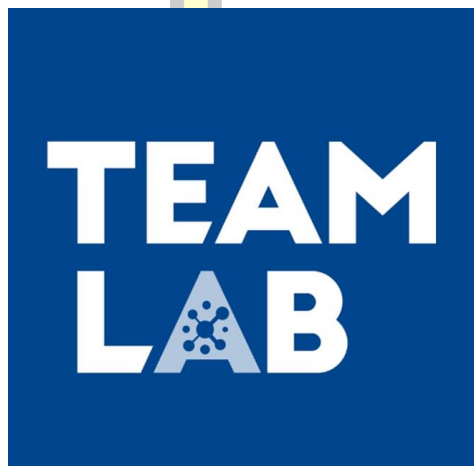

Figure 15 lighting installation art
Source: https://www.bing.com/

WhiteVoid is a renowned interactive lighting sculpture design studio from Berlin, with its Kinetic lighting projects spanning the world and being a pioneering team using TouchDesigner. At the same time, its interactive devices and products are widely used in museums, exhibitions, trade fairs, and concerts. SKALAR "is a large-scale audio visual interactive lighting installation designed by Christopher Bauder and Kangding Ray, creators of WhiteVoid Studio, in conjunction with TouchDesigner, exploring the impact of sound and light on human emotions. In the pitch black industrial space of Kraftwerk Berlin (Berlin Power Plant), a large number of power mirror devices are controlled in real-time using TouchDesigner on site. Through the refraction of light, dazzling and charming light is formed. Combined with multi-dimensional sound listening narratives, mobile lighting and complex multi-channel sound systems are presented. The high stability of TouchDesigner allows for real-time control of lighting and sound effects on site. When the audience is in the device, they

are stimulated by multiple sensory stimuli such as visual, auditory, and tactile senses to stimulate diverse emotions. While integrating into the work, the audience can also endow it with deeper meanings.

Figure 16 interactive lighting sculpture design studio
Source: http://www.touchdesigner.co/

3.2 Innovative Application of TouchDesigner in Interactive Imaging Devices

Compared to traditional imaging devices, interactivity is a major characteristic that distinguishes interactive imaging devices from the two. Integrating interactivity into image installation art not only improves the shortcomings of traditional image installation technology, but also changes the way viewers communicate and express themselves with the work to a certain extent. While appreciating the work, viewers interact with the work, thereby deepening their emotional identification with the artistic work. During the creative process of interactive imaging devices, specific sensors need to be used for information collection and timely transmission to corresponding devices. By using existing computer language linking programs to determine the electrical signals transmitted by sensors, and completing data processing, it is then transmitted to the playback reality terminal in the form of instructions, providing real-time feedback on specific images or images [8]. The high interoperability of TouchDesigner provides more convenience and artistic possibilities for the creation of interactive imaging devices. Its excellent hardware interactivity can distinguish it from other similar interactive software. When creating interactive imaging devices, TouchDesigner can be directly connected to sensors, and data processing can be completed by writing programs on the TouchDesigner platform,

thereby providing feedback on image images. At the same time, the visual node style creative form allows more artists and designers with zero foundation in programming to still use TouchDesigner to design stunning interactive image installation works.

The design team of VolvoxLabs (VolvoxLabs) is from New York. The interactive screen wall they designed and produced for the Microsoft Art Gallery Theater is generated by TouchDesigner. The designer installs movable wooden boards on the wall, and fixes a camera and lighting device behind the boards. Through TouchDesigner, the corresponding data is processed and combined with the camera to capture real-time character movements, thereby controlling the brightness and direction of the light, Each audience controls the images on the screen through their own form of movement, creating a unique sensory experience.

（4）TouchDesigner Projection mapping

Projection mapping, also known as stereo lithography, is a projection technique that transforms objects (mostly irregularly shaped objects) into display surfaces for image projection. By using specially designed software, two-dimensional or three-dimensional images can be projected using programs, and their images can be adjusted to match the object and its environment. The software can interact with a projector and project onto the surface of an object at a specific angle. This technology has been used by artists and advertising designers to add additional dimensions, create visual illusions, and concepts of motion to previously static objects. Light carving projection is often combined with sound, or triggered by sound, to create a visual and auditory impression.

Light carving projection was first applied in advertising and other applications. Large companies such as Nokia, Samsung, and BMW have all used photolithography to create advertisements for their products in big cities. This type of advertisement usually uses mapping technology to project the image onto the edge of the building. Light carving projection can also be interactive, such as Nokia Ovi Maps creating a light carving projection that mimics people's movements. The Lyon Light Festival in Lyon is a festival commemorating the Virgin Mary, and now they are incorporating light sculpture projection into their displays, such as creating the illusion of a pinball table on the sides of large buildings. Common techniques for this

type of display include 3D mapping technology and 3D projection to create illusion of depth, as well as creating a sense of motion resembling a building's crumbling state.

In the electronic dance music community, more and more DJs are combining their music with synchronized visuals. Although the most commonly used projection is still general, some visual artists have started creating customized light relief projections for playback. Many electric dance music creators incorporate light carving and projection techniques into their performances. Even artists who simply use visual presentation will use light carving projection as a way of creative presentation, believing that this can enhance the effectiveness of existing creative media such as painting.

Artists can use it as a avant-garde form of expression, and this new technology can transform their creative concepts into light carving projection, interacting with the audience in a new way. Light carving projection often appears in large cities such as New York and London, and artists can guerrilla publicly display their works without the need for additional applications. Therefore, artists can display their works on any object, with canvas everywhere. Activists often use this as a tool, such as the 2011 Occupy Wall Street movement projecting their works onto the Verizon Wireless Building in New York to inform everyone that the Occupy Wall Street movement is still ongoing. Recently, light carving projection has also been commonly used in Walt Disney Fantasy Engineering and Walt Disney Creative Entertainment in Walt Disney parks and resorts. Examples of using light carving projection include Cinderella Castle and Disney Forever

On the evening of June 30, 2017 at 19:00, the 2017 graduation ceremony and degree awarding ceremony of Tianjin Academy of Fine Arts, the large-scale 3D architectural projection show "We Are Forever in the Garden," was grandly held at our school's Tianwei Road campus. A unique gift from my alma mater to all graduates - the large-scale 3D architectural projection show "We Are Forever in the Garden" created by teachers and students of the Experimental Art College has transformed Tianjin Academy of Fine Arts into a magnificent fantasy garden. The video show consists of three acts: "Looking at the Future", "We Are in the Garden", and "Dream Sails". The first act opens a visual feast with fashionable and dynamic images,

restoring the main building structure, And shuttle through geometric animations and animal shapes, presenting a surreal visual experience.
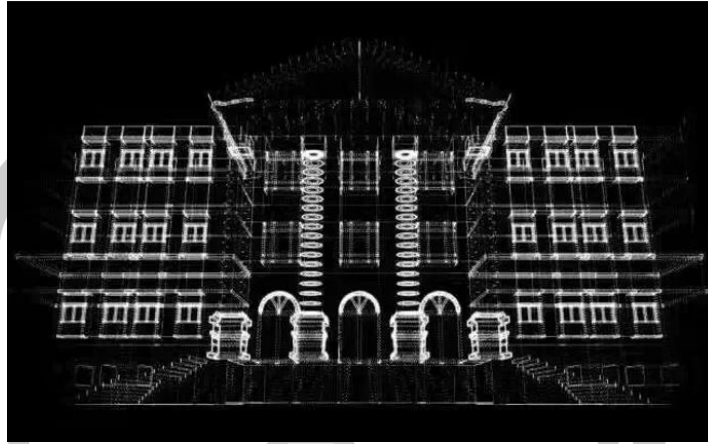
Figure 17 We Are Forever in the Garden 1

Source: http://www.tjarts.edu.cn/

Figure 18 We Are Forever in the Garden 1

Source: http://www.tjarts.edu.cn/

The second act presents Tianmei's century old history through images, and the older generation of artists reproduce the current and century old school history. Combined with the current teaching scene and vivid student life, it conveys the inheritance and promotion of Tianmei, as well as emotions and emotions. Among them, virtual images of representatives of teachers from the Graduate Department and various secondary colleges were specially created, and the names of each graduate

were reflected on the wall, symbolizing the joint entry of teachers and students into the palace of art. Each student will be engraved in the history of Tianmei; In the third act of "Dream Sailing", Dean Deng Guoyuan, together with representatives of the old professor and a team of mentors, came to the main building and dotted the canvas, with flowers flying all over the sky. In the butterfly dance garden, he affectionately and cleverly conveyed the blessings given by his alma mater to all graduates - "May your life be as beautiful as the flower garden"(!Official account of Tianjin Academy of Fine Arts2022)

Figure 19 Dream Sailing

Source: http://www.tjarts.edu.cn/

（5）Creating generative art using TouchDesigner

Generative art is a form of contemporary artistic creation that does not necessarily revolve around artwork or final products, but rather involves the creative process and underlying ideas. A work or product is created by processing a procedural invention, which is a set of rules created by an artist or program, such as natural language, musical language, binary code, or mechanisms.

Generative art "is commonly used to refer to algorithmic art (computer-generated artwork, algorithmic determination). But art can also be created using chemistry, biology, mechanics, and robotic systems, intelligent materials, manual randomization, mathematics, data mapping, symmetry, collage, and more. Many

works utilize the degrees of freedom of computation and the computational speed of computers to implement theories obtained in natural science, giving organic expression a sense of unity, such as the middle between human and nature.

Generative art often provides artists with means to avoid subjective creative intentions. Processing is carried out in the form of relatively autonomous processes in a self-organizing manner, such as according to instructions, through computer programs that execute instructions, image information or other concepts, or other media and AIDS. Under different production conditions, the process runs differently. The results are more or less limited, but unpredictable among them.

Generative art refers to the creation, synthesis, and construction of artistic works through computer software algorithms or mathematical/mechanical/random autonomous process algorithms. Many works utilize the degrees of freedom of computation and the computational speed of computers to implement theories obtained in natural science, giving organic expression a sense of unity, such as the middle between human and nature.
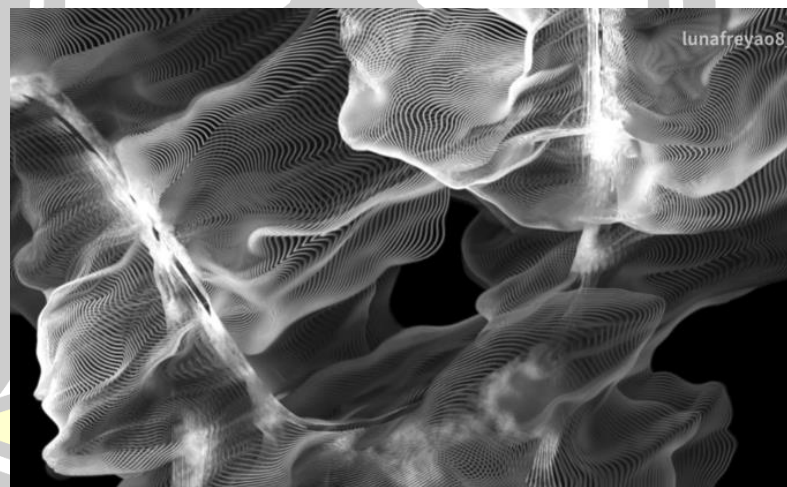

Figure 20 Generative art
Source: http://www.touchdesigner.co/

Generative art is a creative method that utilizes natural science systems as the main body. As a prerequisite, it can be said that unlike other art fields, it is necessary to design an autonomous mechanism to create a work. System work can execute scientific theories such as complex systems and information theory. The systems

constructed using generative art are very similar to those found in various scientific fields. This system changes the complexity of chaotic edges over time and exhibits unpredictable behavior back and forth between chaos and order. However, the system itself operates with certainty. Wolfgang Amadeus Mozart's "MusicalischesW ü rfelspiel" 1757 is an early example of a universal system based on randomness. Its structure is based on both elements of order and factors of disorder.

Due to the creator's requirement for high mathematical imagery skills and complex algorithm design and packaging techniques, the entry threshold is high. People in the scientific community are skilled at handling mathematical formulas and algorithms, and they enter this field by touching the works of this field and feeling a strong attraction. Artists or creators prepare basic principles such as mathematical formulas and template materials, and process them to create works of random or semi random processes. In many works, even based on its fundamental principles, by constructing a system of interactions between theoretical elements, complex expressions cannot be obtained solely through linear addition synthesis of simple elements. The results will remain within the prescribed range to some extent, but there is also a tendency towards subtle and bold changes. The idea of conducting artistic creation activities based on existing works of art is one of the important elements in generating art, representing the fundamental nature of process orientation.

Generative art sometimes introduces real-time and applies feedback and generation processes to the current state of work, constantly changing it. Such works will never see the same situation again. For demonstration scenarios and video jockey culture, various graphical programming environments (such as Max/Msp, pure data) are used to create real-time generated audio-visual works.
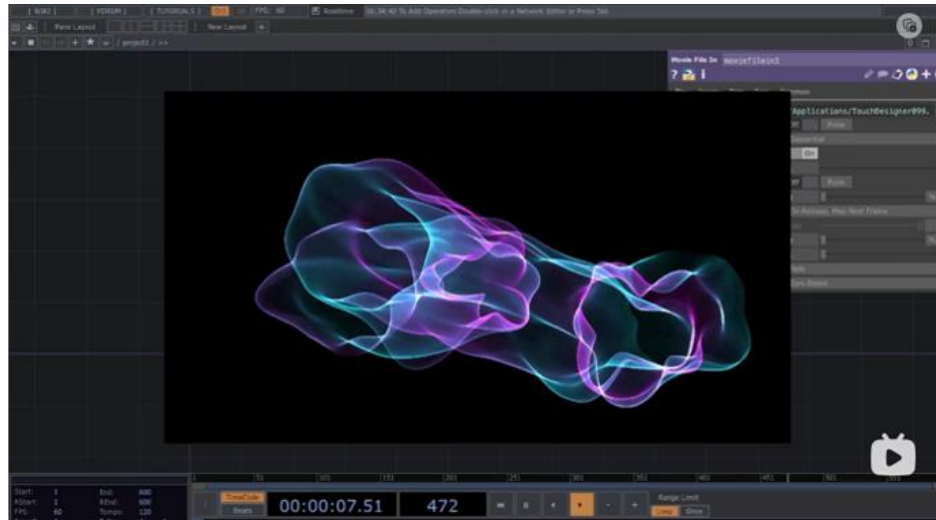
Figure 21 Generative art

Source: http://www.touchdesigner.co/

Until the emergence of Processing in the 1920s, the programming environment that could only focus on the essence of creative content was not maintained, which was a very common creative method. In addition, with the prosperity of various advertising media (websites, digital signage, etc.) in 2010, as well as the dissemination of Processing and OpenFrameworks in school education, this is an area that is expected to develop in the future.

Artificial intelligence and automatic 'behavior' have been introduced as new tools for generating art. Generative art is not an artistic movement or ideology. This is just a creative method, independent of the intention and content of the work.
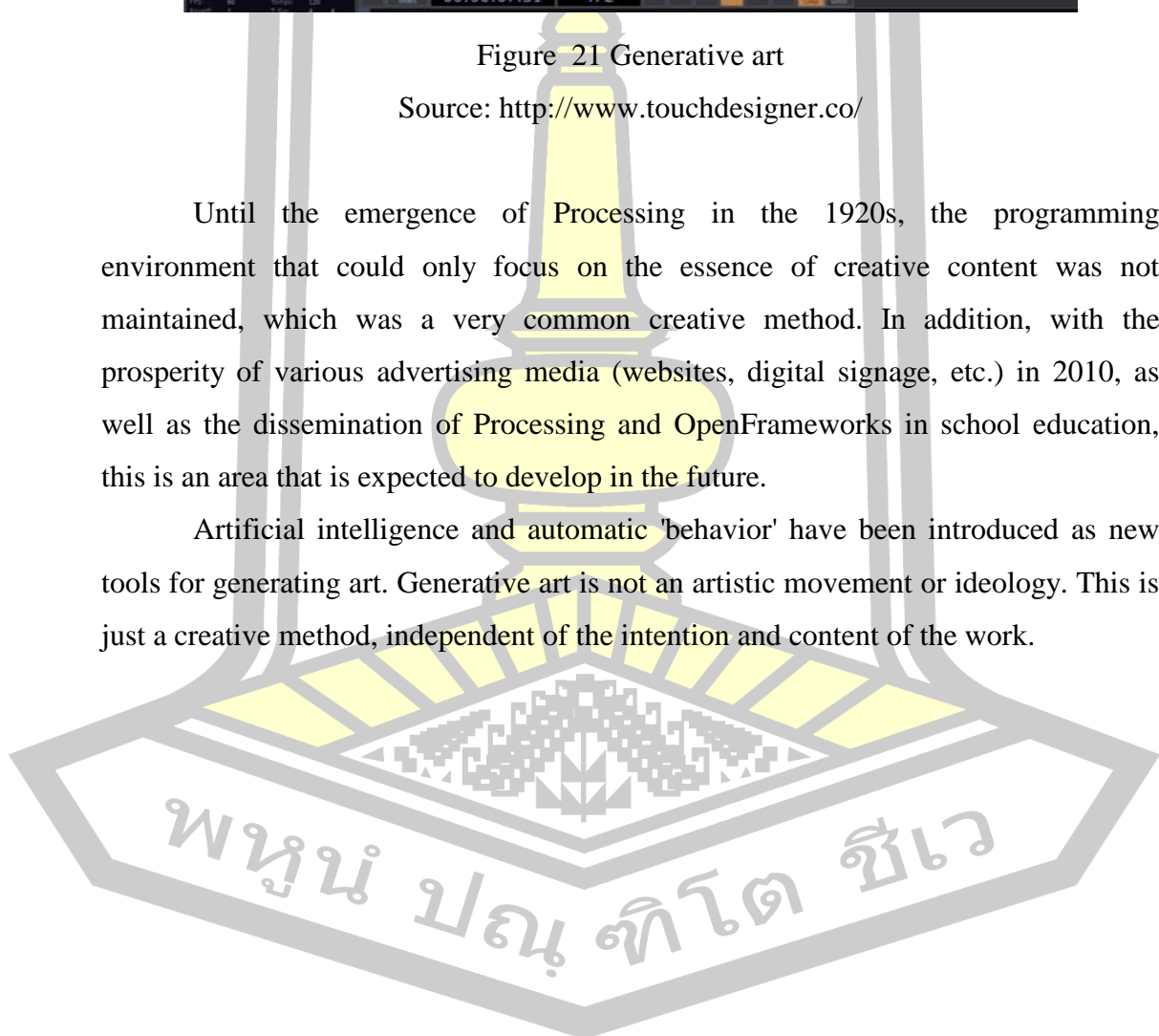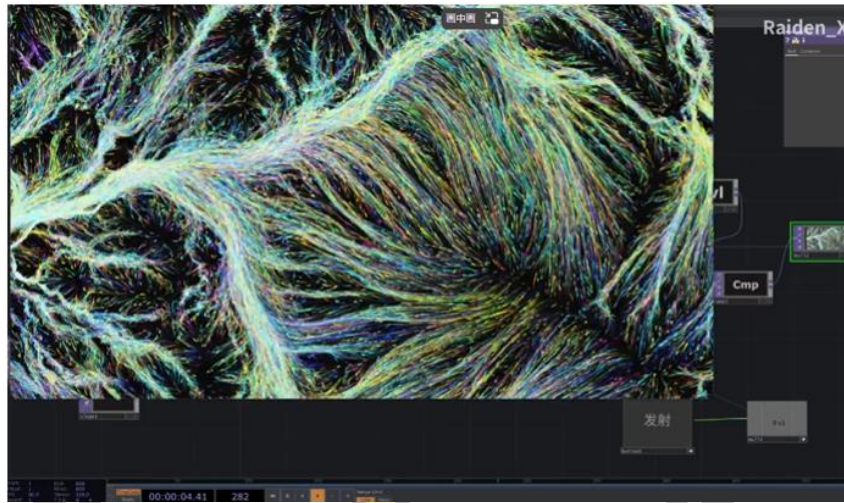
Figure 22 Behavior

Source: http://www.touchdesigner.co/

Among the most widely cited generative art theories, Philip Galant described the generative art system in the context of complexity theory in 2003. The concept of effective complexity was specifically cited by Murray Gell Mann and Seth Lloyd. In this perspective, the highly ordered and highly disordered generative art can be seen as simple. The highly ordered generation art minimizes entropy and allows for maximum data compression, while the highly disordered generation art maximizes entropy and does not allow for significant data compression. The most complex generative art blends order and disorder in a way similar to biological life, and in fact, biological inspired methods are most commonly used to create complex generative art. This viewpoint is inconsistent with the views of Max Benson and Abraham Morse, who were influenced by information theory in the early stages, and the complexity of art increases with disorder.

Galanter further pointed out that given the use of visual symmetry, patterns, and repetition in the oldest known cultures, the resulting art is as ancient as the art itself. He also solved some erroneous equivalence between rule-based art and generative art. For example, some art is based on constraint rules that prohibit the use of certain colors or shapes. Such art is not generative, because constraint rules are not constructive, that is, they themselves do not advocate what needs to be done, but rather what cannot be done.

4.2.3 The Application of TouchDesigner in Chinese Schools
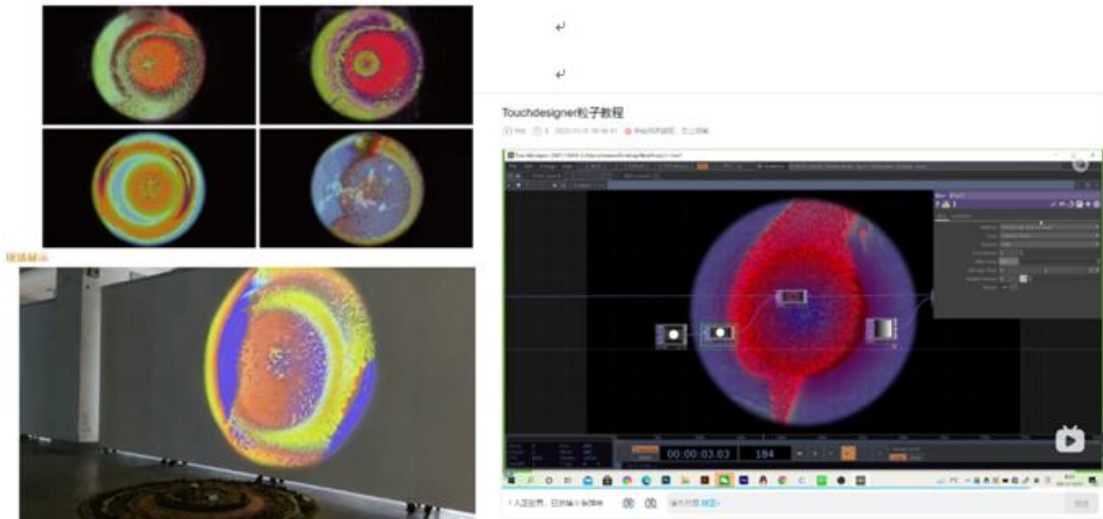
（1）case analysis

Figure 23 Digital media

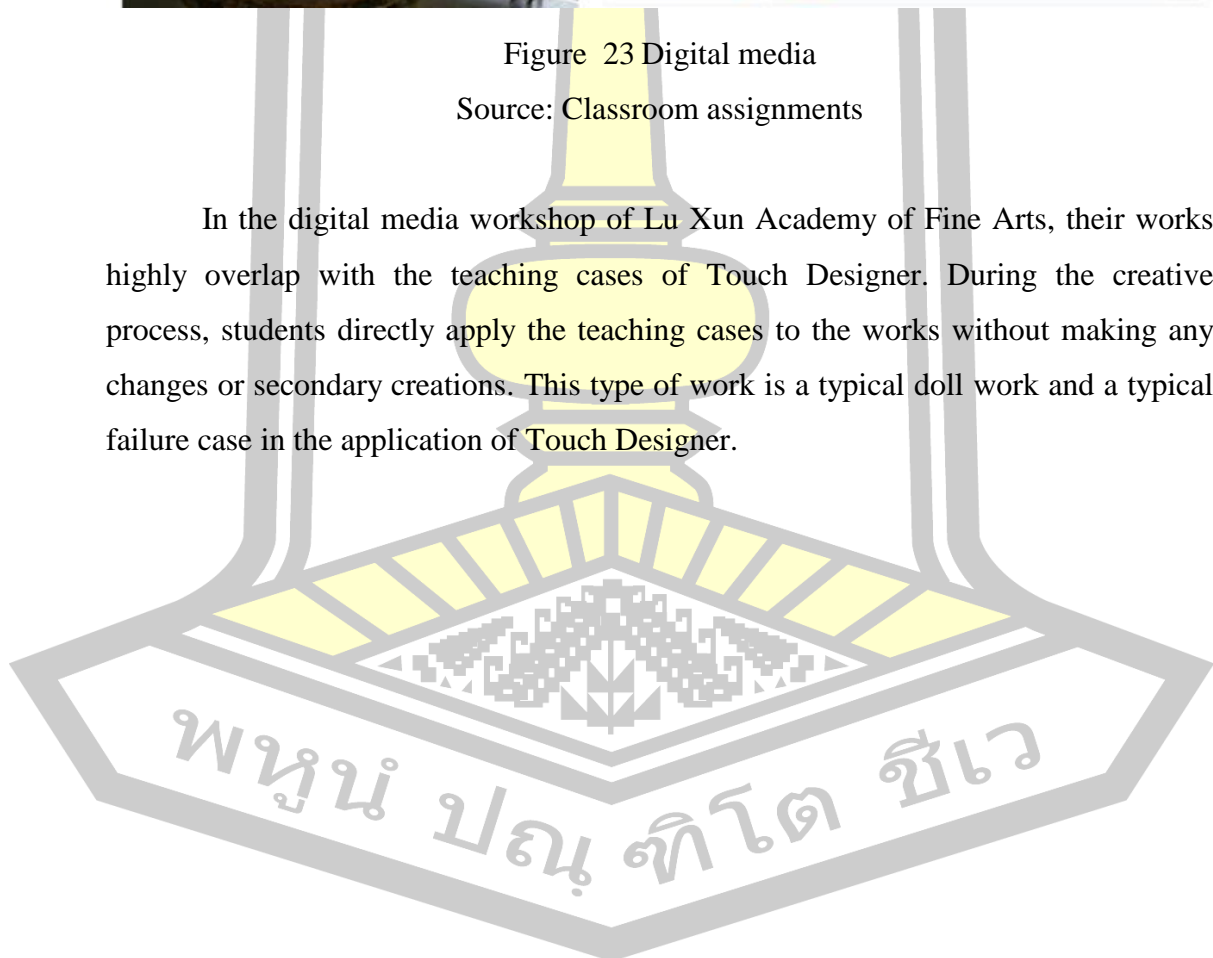Source: Classroom assignments

In the digital media workshop of Lu Xun Academy of Fine Arts, their works highly overlap with the teaching cases of Touch Designer. During the creative process, students directly apply the teaching cases to the works without making any changes or secondary creations. This type of work is a typical doll work and a typical failure case in the application of Touch Designer.
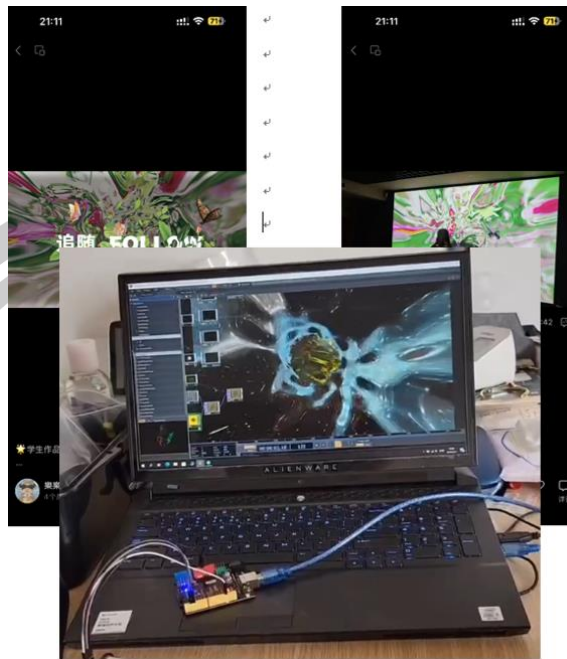
Figure 24 Typical doll work and a typical failure case

Source: Classroom assignments

In the digital media course of Hebei Academy of Fine Arts, a similar teaching case was also found. The original teaching case was called a time and space tunnel, which was a comprehensive application of Touch Designer. The school's teaching case changed the texture of the original course to another texture, and the main object was replaced with a butterfly. The work was modified on the basis of a doll, and in the eyes of professionals, its original underlying case can be seen at a glance, It is also a failure case.
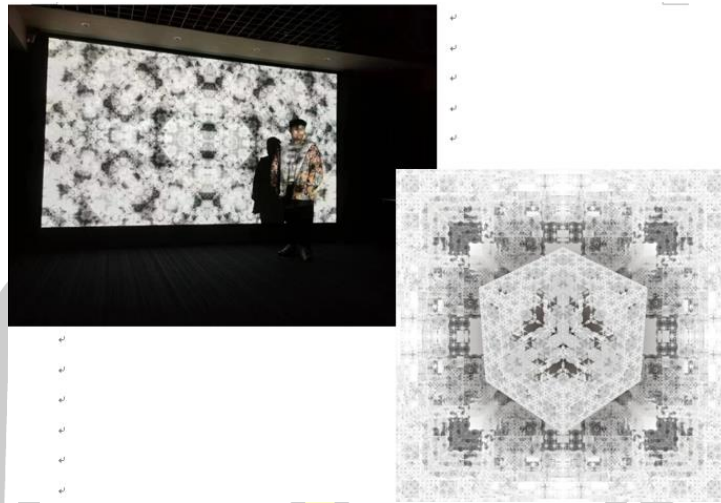
Figure 25 Algorithm application of Touch Designer

Source: Classroom assignments

Similarly, in the algorithm application of Touch Designer, the teaching case experienced repeated plagiarism, using similar algorithms to achieve similar abstract patterns. This case was directly used in teaching, without artistic value, but as a single image. Students can achieve practical results through case teaching, but cannot exist as independent works of art.

Figure 26 Touch Designer

Source: Classroom assignments

This work is also from Touch Designer, and it can be seen that the creator has made modifications to the software parameters. However, it can still be seen that it comes from the teaching case of Touch Designer in the TEA community. This work is a typical Touch Designer creation problem, and its sequential visualization programming determines that this problem will inevitably occur, which is also a typical work of borrowing.
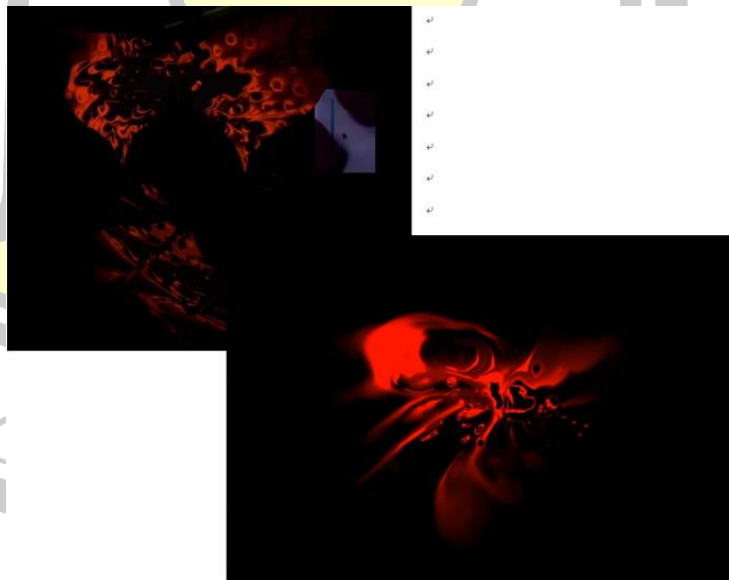
4.2.4 Digital Fun Mature Work Cases are the Right Application Direction

Starry Forest Mercedes EQ Night

Numerical control lighting power matrix visual design

Project Description: In April 2021, the Mercedes Benz Global New Car Launch was held at the Shanghai Shipbuilding. In response to the concept of "green environmental protection, sustainable development" conveyed by this event, three new energy electric vehicles will be released at this press conference, titled "Mercedes EQ Night". This is of great significance for this century old car company on its journey to pursue the trend of new era technology. The CNC lighting visual design developed by Digital FUN this time, we designed a CNC RGB light tube and light ball power matrix for this press conference, creating a dreamy and poetic light and shadow interaction space for the entire atmosphere of the venue, and performed a stunning and stunning music performance during the performance.
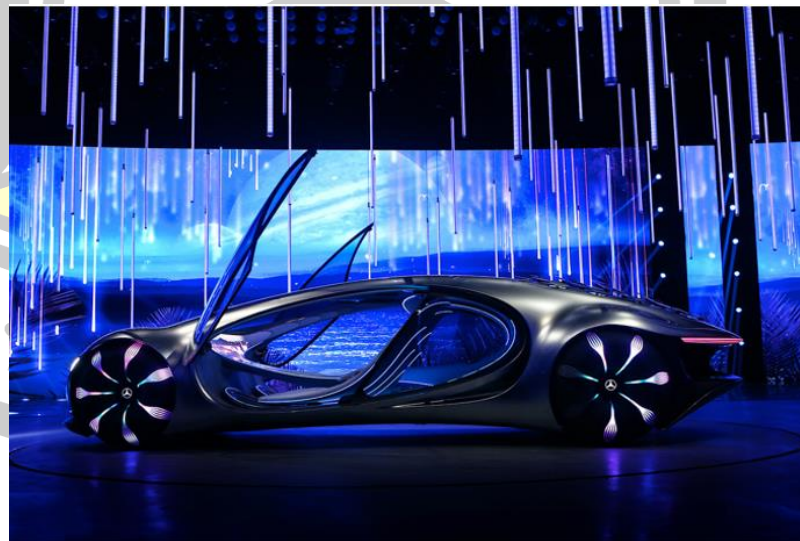
Figure 27 Digital FUN 1

Source: http://www.touchdesigner.co/

Figure 28 Digital FUN 2
Source: http://www.touchdesigner.co/

Lingguang Flash · Xiaomi Intelligent Lighting Show

Intelligent Lighting Interactive Art

Project Description: In October 2020, Digital FUN was commissioned by Xiaomi Company to develop and build an intelligent interactive light bulb wall based on Xiaoai Classmate, which was located at the China Science and Technology Museum and the Mercedes Benz Cultural Center. As one of the few intelligent art works of Xiaomi Company, the studio starts from both visual design and technical research and development perspectives, and utilizes the mobile phone Xiaoai Classmate development platform to embed the system in the cloud, making Xiaomi phones and Xiaoai series audio devices directly interactive with the light bulb wall. The light bulb wall is composed of nearly 2000 LED light bulbs, which can be answered through user inquiries using voice and pixel visual animations, transforming the lighting bulbs into an artwork.
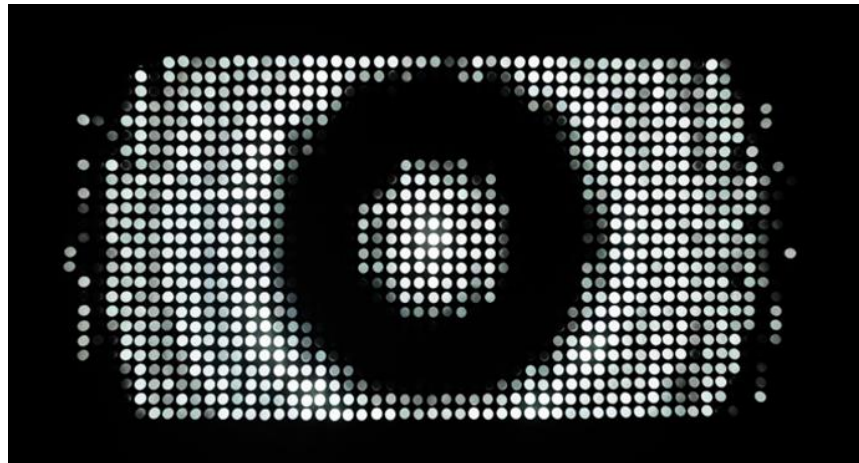
Figure 29 Lighting bulbs artwork 1

Source: http://www.touchdesigner.co/

Figure 30 Lighting bulbs artwork 1

Source: http://www.touchdesigner.co/

Beauty Square Shibuya Mechanical Art Installation

Design and development of power lighting system

Project Description: At the beginning of the 2020 New Year, Digital FUN was commissioned by Japan's Think and Sense company to create a Beauty Square interactive visual flagship store for Shiseido's Tokyo Shibuya store. The central stage is composed of a power lifting system, which customizes the visual effects of traditional press conference performances with lightweight design. Not just a combination of mechanical devices and digital art, Beauty Square's design conveys its brand culture and values to customers: comfort, refinement, and beauty.

Figure 31 Beauty Square's design 1

Source: http://www.touchdesigner.co/

Figure 32 Beauty Square's design 2

Source: http://www.touchdesigner.co/

Figure 33 Beauty Square's design 2

Source: http://www.touchdesigner.co/

Orients Lumina Radiant Forest

Immersive interactive device

Project Description:In October 2022, the large-scale immersive night tour project ORIENS LUMINA Radiant Forest · Dongfang Xiwang, covering an area of 80000 square meters and with a sightseeing route of 1.5 kilometers, was completed in the Forest Park next to the Jiukeshu Future Art Center in Fengxian District, Shanghai. Digital FUN has launched a two-year cross-border cooperation with top international creative company Moment Factory to create the first Lumina outdoor immersive entertainment experience in China. While winning public praise, it also provides a localized "breakthrough" solution for the domestic industry: the dual support of "multimedia interactive technology+creative art content" can activate a new business model of night tourism economy.

Figure 34 ORIENS LUMINA Radiant Forest · Dongfang Xiwang 1

Source: http://www.touchdesigner.co/

Figure 35 ORIENS LUMINA Radiant Forest · Dongfang Xiwang 2

Source: http://www.touchdesigner.co/

Figure 36 ORIENS LUMINA Radiant Forest · Dongfang Xiwang 3

Source: http://www.touchdesigner.co/

4.2.5 Touch Designer Art Interview

Interviewee: Zhang Jun, Art Director of DigitalFun,

What was the opportunity that led you to establish a digital fun studio?

Zhang Jun: The establishment of Digital FUN Studio was due to a coincidence. In 2018, when I was still in Canada, I came into contact with TouchDesigner during my graduate studies and also participated in the TouchDesigner offline workshop located in Vancouver, Canada. I met some like-minded creative technology professionals and became unstoppable from then on. We have founded the Vancouver TouchDesigner community in Canada, and every month we gather some local friends who learn and use TouchDesigner to share their experiences.At the same time, I started searching for domestic users using TouchDesigner, trying to establish some connections. I accidentally found my later partner, Totti Chen Ruokun, on Facebook. After a brief conversation, we were surprised to find that both were from Fujian and graduated from Tongji University. Such a coincidence makes us feel that we must do something to be able to live up to God's arrangements. So soon Digital FUN Studio was born, and after a year of remote operation, I returned to Shanghai in 2019 to start operating Digital FUN.

What changes have been brought to the environment and soil of new media practitioners by engaging in the development and artistic creation of TouchDesigner courses?

Zhang Jun: I first learned about TouchDesigner software in 2012. At that time, not to mention Chinese tutorials, even English tutorials were limited, and the community's users were also very limited. Over the years, from my personal experience, it can be said that whether developing the TouchDesigner community abroad or participating as a Digital FUN project in China, using TouchDesigner for creation and problem-solving has been a continuous process. Because of these accumulated experiences and in the hope that more enthusiasts can come into contact with TouchDesigner, we have entered the industry. Therefore, we have made many expansions in the fields of Chinese education and communities, including online and offline courses, creative camps, workshops, and so on. The hope is to bring more creative ideas and problem-solving possibilities to the entire new media industry, as well as the technology and art fields, with a focus on points and areas.

What do you think is the relationship between good communication works and the audience?

Zhang Jun: Interactive new media works themselves have certain mechanical and technological attributes, and they are bound to have a sense of distance beyond daily life. Good interactive works can better grasp this scale. It can not only open up the audience's participation and sense of experience, but also express the concepts that artists themselves want to convey through their works. Achieving a subtle balance between the two is something that an excellent work needs to think about.

How do you solve the contradiction between thinking and execution in creativity?

Zhang Jun: This contradiction has always been difficult to solve, mostly due to a situation where there are more observation and thinking ideas, and fewer solutions that can be implemented, especially in the interactive new media industry. If there is some experience sharing, it still depends on the accumulated landing ability in the project, which can help me quickly evaluate the feasibility of an idea.

The most satisfying work is always the next one conceived in the mind (laughter). Looking back at my previous works, I am more satisfied with my performance in collaboration with musician EAU at the 2021 Lightpoint International New Media Art Festival.

Which is important to you, creativity, technology, or narrative?

Zhang Jun: Creativity is concept and planning, narrative is design and arrangement, and technology is landing and presentation. The three are similar to the relationship between the three primary colors, forming a project or work. It is like using pigments for painting creation, but it is just the difference between the light and the heavy in different situations. In terms of personal experience, I studied Chinese painting from a young age and, like other art candidates in China, went through the art college entrance examination of sketching and color. In Tongji, I studied Environmental Art Design for my undergraduate studies, and as a graduate student in Canada, I majored in digital media with applied science as the main subject. I have some experience and exploration in creative narrative and technology to some extent. Therefore, for me, creativity, narrative, and technology are the choices that children make, while adults are all important.

Interviewee: Bai Xiaomo, Algorithm Artist | Electronic Musician | Software Engineer

Why did the opportunity make you choose to be an artist, using music and visual as a carrier for artistic creation? How do you find inspiration when creating ambient music?

M: I studied computer communication during my undergraduate studies and electronic music composition during my graduate studies. In 2004, I started using algorithms to generate music. While studying audio and music algorithm logic, I realized that there are many similarities between digital audio and digital visual images at the bottom of the computer system, and began to try to create computer audio-visual interactive art works.

I have studied some spatial art works, including early stone carvings, sculptures from the 19th to 20th centuries, and art works made using lighting and electronic devices since the 1960s. I will seek inspiration for creating sounds from these spatial art works.

Please introduce your work 'All Things'.

Figure 37 All Things
Source: https://mp.weixin.qq.com/

M: Everything is a computer audio-visual interactive artwork generated using algorithms. This work stems from my interest in the Book of Changes. At first, I wrote a program for divination in the Book of Changes, which dynamically presented the content of divination names, symbols, words, and words with a graphical interface. Later, a sound engine was added to generate some minimalist electronic sounds using algorithms. Finally, use the signals in the sound to drive the changes in

the name and appearance of the hexagrams. The work "All Things" is a simplified version of a part of the divination program in the Book of Changes, and it is also a "byproduct" of this divination program.

The craziest plan you have ever made in your creative genealogy is, what interesting thing happened?

M: My work "Inheritance" (Mechanical, Electronic, and Sound Devices) created for the 2021 Chengdu Biennale uses a six axis robotic arm and two 1800 watt Tesla coils. I installed a depth camera on the robotic arm, which gave it eyes. Then, place these electronic devices in a jungle, and the robotic arm searches for and approaches the Tesla coil, which will discharge the Tesla coil and make a specific sound. The two Tesla coils are like two mushrooms hidden in the jungle. The movements of the robotic arm in the jungle are designed through computer programs, and it moves like a cobra. I use this to suggest the origin and cycle of life. The entire work places artificial objects (robotic arms, Tesla coils) into the environment of natural objects (jungle), creating a strong contrast and triggering some thinking.

Figure 38 Inheritance
Source: https://mp.weixin.qq.com/

The exhibition period of the 2021 Chengdu Biennale is 8 months, and this work has been in operation at the Chengdu Tianfu Art Museum for 8 months. Because Tesla coils ionize the surrounding air during discharge, producing ozone and having a bactericidal effect. So after calculating the size of the exhibition space, I modified the parameters in the program to set the discharge frequency of the Tesla coil to a

reasonable value, so that the entire exhibition space is at a reasonable ozone concentration, playing a role in disinfection and sterilization.

What is your understanding of sound art? How to solve the contradiction between creative execution and thinking concepts?

M: Sound art is first based on time, followed by abstract art.

There are many ways to create and create sound, and the key is how to organize the sound in the work and enhance its artistic quality.

My creations are all achieved through programming for sound, video, control, and interaction. Technology itself is rational, so basically my work will verify whether the technical path is feasible during the proposal period. If the technical path is not a problem, then continue to deepen the concept of the proposal; If the technical path does not work, then it is necessary to adjust the plan. In short, identifying problems, especially technical issues, should be done early and not until the exhibition period, as it can be very troublesome.
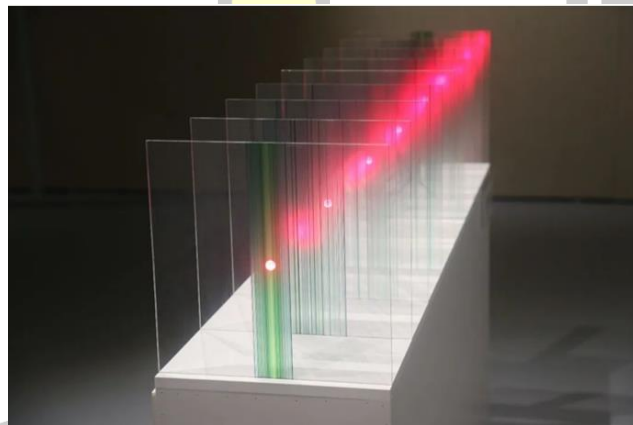
Figure 39 Technological art

Source: https://mp.weixin.qq.com/

How to understand "technological art"? Which is more important, creativity, narrative, or technology?

M: Technological art is not only a simple "grafting" at the level of technology and art, but also a deep fusion of the two at the genetic level. VR, digital games, and other products produced using computer technology are a form of technological art, but this form is too conventional and industrialized.From an artistic perspective, I believe that 'artistic language' is the most important, not only in traditional art but also

in technological art. Excellent works of art often possess distinctive artistic language. Compared to traditional art forms, the artistic language system in technological art has added a new dimension: understanding the essence of computers and algorithms. So I believe that "language" and "technology" are very important in the creation of technological art.

Interviewee: Wang Changcun, New Media Artist | Sound Artist

How to view the help or significance of contemporary art scenes for people?

W: It can make people feel that the world is full of possibilities and that everything is over, but most of it can still help people post a set of photos on Instagram.

Did algorithmic music trigger your inspiration?

W: Using simple algorithms and patches to make music is the only way I know a little bit. Actually, I don't have many choices, and the process of trying to explore is easier for me to encounter inspiration. Basically, I went to the algorithm for help in order to create the music I imagined, so I didn't actually have a particularly in-depth understanding of the category of 'algorithm music'. I prefer simple methods. Simple things are more robust and easier to embed into other systems later on.

What is your understanding of new media art and the value of artificial intelligence creation in your eyes?

W: New media art is a network that connects different media, and 'connection' is not limited to digital connections, but also includes connections of thinking. Artificial intelligence technology is very powerful and can accomplish many things that were previously considered impossible. However, the direction of the movement of "artificial intelligence creation" is now very questionable. "Understanding the language/text requirements given by others and providing results that most people think are possible" is more like taking on tasks rather than creating. When the public's demand for cultural content can be fully met by artificial intelligence, it is actually the day when artificial intelligence dominates humanity. Or perhaps' creation 'is actually overestimated, and people don't actually need it. Without it, humans will usher in a better way of life. At present, people are happy to discuss artificial intelligence, and the ability to create is actually a consolation to prove that they are not completely crazy.

4.3 The creative method of TouchDesigner in contemporary art creation

4.3.1 TouchDesigner's creative methods in contemporary art creation

Through months of research, five famous artists interviewed in the survey questionnaire have come to the conclusion that Touch Designer's teaching should be diverse and open, and should not be studied as a single discipline. Therefore, I have proposed innovative divergent thinking teaching methods for course design, where students use their expertise in subject integration and creation to achieve comprehensive use of software. In an interview with the head of Shanghai TEA, they conducted research on Touch Designer as a science subject, as it involves programming languages
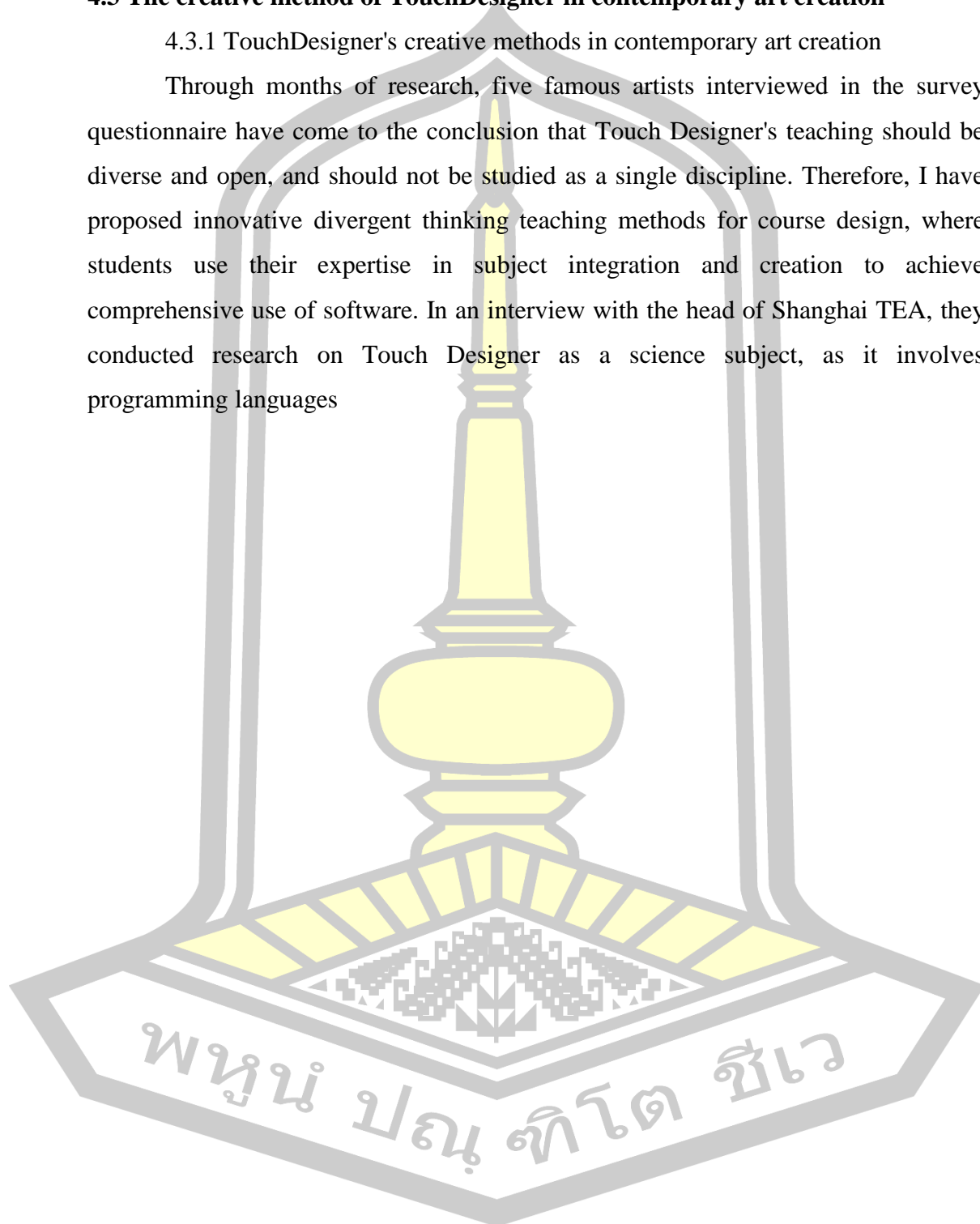
Table 3 survey form

TouchDesigner Research Area	Beijing	Shanghai	Guangzhou
current	The Central Academy of Fine Arts and the Academy of Fine Arts at Tsinghua University have established a digital media interactive art studio and participated in national level projects	The TEA community and DigitalFun organization have launched new Touch Designer courses and undertaken multiple media conferences	Guangzhou's universities have incorporated Touch Designer into basic subject workshops for teaching
proublems	In terms of talent development, professional teachers have disciplinary limitations and lack innovation	Most of the teaching materials of institutions and associations come from foreign networks, and the proportion of self innovation is relatively low	Teaching is mostly based on previous practices and lacks innovation
school teaching	Having a certain academic foundation, the proportion of courses has been increasing year by year	Art universities have similar courses to other universities, but science and engineering universities have significant advantages in practical technology	The course is repetitive, with most students studying online and in other cities
Artist's perspective	The discipline construction of Touch Designer should be based on strong technical support, integrated with social practice in schools, and developed in practical projects.	TouchDesigner art and technology are an important part of current media art, and they need to complement each other, absorbing the advantages of science and engineering colleges and art schools	Pay attention to social issues in individual and group art creation, and integrate new technologies as a current language

For Touchdesigner software, the use of learning software alone cannot meet the aesthetic needs of creation, and it is necessary to view this software and teaching from the perspective of experimental art. Here, the teaching model of interdisciplinary research and innovative thinking is cited. Firstly, Touchdesigner has rich creative and display directions, and we divide the scope of works into experimental art. Experimental art has various artistic forms such as imaging and interactive art, On this basis, the teaching concept of interdisciplinary research is introduced. Cross disciplinary "is the main trend and trend in the development of technology and literature in modern society. The current classroom teaching should not only focus on imparting knowledge and cultivating abilities within disciplines, but also on the infiltration of knowledge and abilities between disciplines. Therefore, today it is widely used as a teaching method in subject teaching. It is not difficult to imagine that since it was proposed in China, scholars have always welcomed it, and existing academic research has studied its specific applications in various disciplines from various aspects.

Analysis of the Concept of "Cross disciplinary"

The rise of "interdisciplinary" in China was in the 1980s, and in the following decades, scholars have studied various teaching models and principles under interdisciplinary conditions. Taking art as an example, research on interdisciplinary teaching such as digital media art, comprehensive art, and art studies has greatly enriched art teaching. However, the concept of "interdisciplinary" is very vague. The National Academy of Sciences, National Academy of Engineering, and National Institutes of Health of the United States point out that "interdisciplinary research is the integration of information, data, technology, tools, perspectives, concepts, and theories from multiple disciplines by teams or individuals to solve problems that cannot be solved within a certain discipline and research field." 1 Chinese interdisciplinary research expert Liu Zhonglin believes that, Cross disciplinary research is a scientific creative activity carried out by scientific research subjects on the basis of scientific division, breaking the boundaries between different disciplines, and crossing different research fields. It is an important means to solve complex scientific and technological problems and social problems and achieve the mutual penetration of different disciplines. "2 In existing interdisciplinary teaching and

research, most of them simply borrow this concept and do not delve into the meaning of the concept itself. Therefore, before exploring the application of interdisciplinary teaching methods in the field of art education, it is necessary to briefly explain this concept.

Simply put, interdisciplinary teaching is a teaching method that combines or intersects several disciplines. Its core should be to break the original teaching habits and teaching thinking methods of disciplines, go beyond pure disciplinary teaching objectives, and replace them with common teaching objectives of multiple disciplines. In the integration and cross teaching of multiple disciplines, establish horizontal connections and integration between knowledge and abilities of each discipline, Thus promoting the overall development of students' comprehensive qualities and also promoting the improvement of their individual subject learning abilities. However, this is not the whole concept of "interdisciplinary". With the deepening of interdisciplinary research, foreign researchers usually view interdisciplinary as a comprehensive concept, which is a collective term for various levels of disciplinary cooperation. From beginner to advanced, it is usually divided into multiple disciplines (multi disciplinary), complex disciplines (pluri disciplinary), cross disciplinary (cross disciplinary) There are five categories: inter disciplinary and trans disciplinary. In academic research, many Chinese scholars often fail to understand the differences between these five different degrees of disciplinary cooperation, often mixing them up, and even more so, translating the English words pluri disciplinary, cross disciplinary, and inter disciplinary without distinction, all as "interdisciplinary", which is clearly problematic.

Multi disciplinary: It refers to teaching two or more majors under a comprehensive subject, such as "art" and "humanities". The multidisciplinary teaching process does not pursue mutual cooperation or the formation of a common theoretical framework, but only conducts teaching within their respective fields. Most traditional schools adopt a multi-disciplinary teaching approach, which has the disadvantage of lacking mutual penetration and connection between disciplines and simply accumulating knowledge.

Complex disciplines: In the teaching mode of complex disciplines, there is a certain connection between various subjects, but there is no in-depth connection in the

specific concept expression, and like multiple disciplines, there is no common theoretical framework formed. Many interdisciplinary teaching attempts in China have ultimately failed to break away from the model of complex subject teaching.

Cross disciplinary: The difference between interdisciplinary teaching and the first two lies in the dominance and leadership of the concept of one discipline, and the interaction between disciplines is unilateral.

Interactive discipline: When domestic academic research uses the concept of "interdisciplinary", it actually refers to "interactive discipline". It is usually translated as "interdisciplinary" in China, but in order to distinguish it from other disciplinary cooperation models, the author has translated it as "interactive discipline" to better illustrate its differences from the other four. In the interactive subject teaching mode, there is a high degree of cooperation between disciplines, and the teaching content of different disciplines is coordinated and developed, forming a common theoretical framework.

Cross disciplinary: Multi level and comprehensive cooperation and interaction among all subjects within the entire education system. At present, the proposal of interdisciplinary teaching is more like a utopian ideal. Although it exists as the ultimate form of interdisciplinary teaching, the possibility of its implementation is not high.

For the convenience of later analysis, the concept of "interdisciplinary" used in this article is equivalent to the concept of "interactive discipline", which forms a common theoretical framework of interdisciplinary high cooperation.

Problems in interdisciplinary teaching of art education

Firstly, it is well known that collaboration between disciplines is not achieved overnight, as it requires a significant amount of time and effort from schools and teachers. Researchers in interdisciplinary teaching generally suggest that in order to integrate interdisciplinary teaching methods into the teaching process, teachers should be involved in all disciplines, which means that the amount of lesson preparation for teachers needs to be greatly increased. In addition, interdisciplinary teaching also requires in-depth communication and cooperation between teachers, as well as between teaching and research departments. But the reality is that professional teachers in schools do not have enough time to address this challenge, and even more

so, the Interdisciplinary Science and Education Society has reduced the teaching volume of various branches of art subjects.

Secondly, interdisciplinary teaching tends to overlook the professional depth of a subject. In the past, traditional education only identified Chinese language and mathematics as core subjects and regarded art courses as optional subjects. However, with the development of the theory of multiple intelligences, comprehensive art education has received increasing attention. What is' comprehensive '? In the National Art Curriculum Standards, four "comprehensions" are emphasized, namely, major comprehensions within the unit, minor comprehensions within the class, inter disciplinary comprehensions between art related disciplines, and inter disciplinary comprehensions between art and non art related disciplines. Although comprehensive art education uses interdisciplinary teaching methods to connect or integrate various arts such as music, art, drama, dance, film and television, hoping to complement and strengthen each other, the corresponding teaching time provided for in-depth learning of a subject is reduced. Although it reaches the width of the profession, it cannot reach the depth of the profession. It is worth noting that when the budget and funds invested in discipline construction decrease, it is very easy to merge these independent majors such as music, art, drama, etc. into a comprehensive discipline.

Once again, the interdisciplinary teaching approach provides opportunities for the art discipline to interact with other disciplines, but in collaboration with other disciplines, the art category often fails to maintain its own disciplinary uniqueness, resulting in a shift in research focus, especially for traditional advantageous disciplines or disciplines that have been vigorously constructed by the government and schools. For example, psychology and aesthetics, which intersect the fields of psychology and art, belong to a branch of psychology, It does not belong to the art discipline. Cross disciplinary art education has become an academic testing ground for various disciplines to graft into the field of art, rather than a true disciplinary field. If the art major is unable to maintain its unique value solely for the usefulness of overall education, then such art education is actually going backwards. Therefore, in the process of interdisciplinary teaching, we must recognize the importance of art as a discipline, rather than piecing together texts from various disciplines for interdisciplinary purposes.

Finally, interdisciplinary teaching requires teachers to possess high professional qualities. This is a problem that scholars often overlook when discussing interdisciplinary teaching. The most crucial issue for teachers to effectively utilize interdisciplinary teaching lies in their professional qualities. In the current four-year university training process, learners often only have a deep grasp of a major. How can we cultivate a qualified interdisciplinary teaching teacher? This is a question worth pondering. At present, a feasible approach is to encourage teachers to learn and delve independently, because when studying an art form to a certain depth, they will unconsciously be attracted to other art forms, which can effectively stimulate students' interest in other fields of study during the teaching process.

Discussion on the Training Strategy of "Digital Art and Design" Talents for Interdisciplinary Integration, Digital art and design are the combination of technology and art that emerged in the 20th century. The rapid development of computer and network technology has promoted the in-depth research and widespread application of digital art, intelligent CAD, computer animation, and digital entertainment. Computer scientists and digital artists at home and abroad are creating computer art with unprecedented enthusiasm from a higher starting point. Industry professionals in software, digital entertainment, and other fields are also paying close attention to the creative achievements of digital art and design, such as digital animation, digital music, and so on New forms of expression such as digital dance, digital art, digital photography, digital movies, and digital museums, as well as new design methods such as networked design, collaborative design, and virtual design, have led to the emergence of "post industrial design". In the post industrial design era, the high integration of digital technology, art, and design has given birth to the emerging interdisciplinary field of digital art and design.

Digital art and design mainly include artistic works and product designs that are completed by combining computer, network technology, digital technology, design technology, video and film technology. They can be expressed from two-dimensional, three-dimensional, spatiotemporal, and other perspectives through text, graphics, images, videos, audio, products, and other means. It contains various information acquisition, organization, representation, design, feedback, etc., and is an emerging and complex research field. The advantage of digitization is that it is not

easy to lose information during production and transmission, and the amount of information stored is large. Digital art and design refers to the use of digital forms to express, transmit, and design works or products, which have new characteristics due to the adoption of new forms.

The emerging discipline of digital art and design is formed against the backdrop of the high development of technology, economy, and culture in China. It is a highly integrated and intersecting product of digital technology, art, and design, requiring the full participation and collaborative work of experts from multiple fields such as computer science, art, and design. At the same time, it is also necessary to cultivate composite talents with high software development skills, strong design abilities, and artistic cultivation, To adapt to the rapid development of the emerging discipline of digital art and design. Due to a relatively short period of time, a complete theoretical system has not yet been formed, but it has begun to take shape.

Therefore, exploring strategies for interdisciplinary and interdisciplinary integration to cultivate innovative talents in "digital art and design" is of great significance for improving the overall comprehensive strength of Chinese universities, improving the development level of this industry, shortening the gap with foreign universities, and cultivating high-tech innovative talents across the century.

The current status of education based on touchdesigner

From the perspective of interdisciplinary and interdisciplinary talent cultivation, some internationally renowned universities such as Harvard University, Stanford University, Princeton University, etc. have invested heavily in establishing interdisciplinary research institutes or centers that span multiple disciplines such as biology, physics, chemistry, etc., gathering the wisdom of experts from different disciplines such as physicists, chemists, and biologists to promote interdisciplinary integration and penetration. Interdisciplinary centers have been established in China, including Tsinghua University, Peking University, Xi'an Jiaotong University, Chinese Academy of Sciences, and Nanjing University.

From the perspective of disciplines related to digital art and design, in developed Western countries such as the United States, many famous universities have established bases for research and education in digital art and design, and many multinational corporations are investing in projects related to digital art and design.

Massachusetts Institute of Technology, Carnegie Mellon University, Columbia University, University of Toronto, University of Illinois and other famous universities have established relevant colleges or departments to carry out relevant scientific research and personnel training. Hollywood in the United States is the embodiment of this model. In China, many universities such as the School of Fine Arts at Tsinghua University, Tongji University, Shanghai Jiao Tong University, China Academy of Fine Arts, Zhejiang University of Technology, etc. have established relevant majors or departments. The School of Software at Peking University has established the Department of Digital Art Design, the Beijing University of Aeronautics and Astronautics has established the Digital Media System, and the Animation School of Beijing Film Academy has trained talents in digital media design, network media design, animation design, and other fields.

However, in terms of research, digital art and design still require in-depth and comprehensive exploration in the following aspects: ① conducting research on digital art and design methodology, studying the scope, connotation, characteristics, and supporting disciplines of digital art and design, and laying a solid theoretical foundation for digital art and design; ② Further research on art and design, exploring the forms of art and design in the digital age; ③ Further research on corresponding computer technologies, such as computer graphics technology, intelligent CAD technology, computer-aided industrial design and conceptual design (CAID&CD) technology, virtual human technology, soft computing technology, etc.

Looking at the current situation of interdisciplinary and interdisciplinary graduate training in various domestic universities, we believe that there are still some problems in terms of ideology, system, and training mode, mainly reflected in:

Insufficient ideological liberation, inadequate management and education system.

Research methods with interdisciplinary characteristics have not yet been formed. Cross disciplinary and interdisciplinary graduate education is currently being attempted, and there is no research method with its own disciplinary characteristics yet.

The teaching research direction and curriculum are not standardized. At present, the research direction, curriculum design, and selection of course content for interdisciplinary and interdisciplinary graduate students vary from school to school and from supervisor to supervisor, and the teaching and research direction and curriculum design are not yet standardized.

The condition of the teaching staff is not ideal enough. Generally speaking, mentors are very familiar with the knowledge of their own research field, but for interdisciplinary and cross disciplinary situations, they are often not ideal. This has brought about a series of mismatched aspects in teaching and research.

An interdisciplinary and interdisciplinary graduate education system with Chinese characteristics has not yet been formed.

In order to meet the needs of international development, the School of Computer Science at Zhejiang University approved the establishment of the "Digital Art and Design" discipline in 2003, with doctoral and master's programs in digital art and design. The discipline has a digital art and design laboratory, a product innovation research group and other bases. Relying on the School of Computer Science of Zhejiang University, the Institute of Modern Industrial Design, and the State Key Laboratory of CAD&CG of Zhejiang University, it has a strong scientific research and development design force in computer science, industrial design, art design and other cross fields, and has more than 30 post doctoral, doctoral, master and other researchers, At present, multiple research directions have been formed, including digital art, product innovation design, computer-aided industrial design and conceptual design, virtual humans and new media, virtual design technology, and computer animation technology. At the same time, this discipline relies on the "Computer Science and Technology", "Industrial Design", and "Network and Digital Media" majors of the School of Computer Science to continuously absorb new graduate talents and cultivate innovative talents towards the forefront of the world.

Talent cultivation strategy

Since the establishment of the discipline "Digital Art and Design", we have developed a disciplinary composition system and research content based on the characteristics of the discipline, as shown in Figure 1.

Concept of interdisciplinary and innovative talent cultivation

For students engaged in computer technology research and interested in art, they have mastered certain computer theories, methods, and technical means, such as computer language, artificial intelligence, computer graphics, etc., but lack the necessary in-depth understanding of art and design. Therefore, it is necessary to cultivate students' mastery and understanding of certain aspects of art and design, and then combine their own knowledge structure to find suitable research directions in the research content of "Digital Art and Design" (as shown in the figure), and carry out in-depth research on digital art and design technology, tools, methods, and other aspects.

For students engaged in art and design research, they have mastered certain "content" such as music, dance, design theory, and design methods, but they lack mastery and in-depth understanding of computer technology and design technology. Therefore, it is necessary for them to combine computer technology knowledge to achieve the technicalization of "content" research and achieve training objectives.

However, how to effectively integrate the above two and form a unique educational philosophy, value orientation, awareness, and cultural atmosphere requires effective and in-depth exploration in management, teaching, and research to find a talent cultivation concept that not only meets the development of the discipline and has Chinese characteristics, but also meets the requirements of school training. After several years of exploration, several doctoral and graduate students have graduated from this interdisciplinary field, accumulating some experience for the development of this interdisciplinary field.

Mechanism for cultivating interdisciplinary and innovative talents

At present, China's higher education lacks innovative vitality, and the lag in cultivating innovative talents is caused by institutional imbalance, manifested as the coexistence of insufficient institutional supply and surplus institutional arrangements. To fundamentally solve the current problem of inadequate cultivation of innovative talents, it is necessary to start with institutional construction. Transform the old education management system and talent cultivation model, and actively explore institutional systems that are conducive to the growth of innovative talents. Mainly including: enrollment policy, curriculum design, assessment system, degree awarding, etc.

Enrollment Policy

To cultivate innovative research talents across disciplines, it is necessary to break past enrollment policies and encourage interdisciplinary and interdisciplinary talents to apply. Therefore, in terms of enrollment policies, we encourage students from multiple disciplines such as computer science and technology, art design, literature and art, industrial design, psychology, mathematics, management, mechanical engineering, etc. to apply. At the same time, in the design of entrance examination papers, we have set different test papers for different training methods to attract talents who are conducive to developing the characteristics of our discipline.

Course Settings

Curriculum design is an important manifestation of cultivating interdisciplinary talents. Interdisciplinary talent cultivation requires a curriculum that is both broad in scope and deep in depth. Not only is it suitable for interdisciplinary talents to choose courses, broaden their knowledge, and conduct cross disciplinary research, but it is also important to pay attention to a certain theoretical depth to meet students' research abilities. In addition, students should be encouraged to utilize the overall resources of the school, take courses related to research, broaden their knowledge and deepen their research depth.

At present, this discipline has offered specialized courses in computer application cutting-edge, digital art and design technology and applications, as well as elective courses in computer graphics and CAD methods, virtual environment and applications, virtual human technology and applications, digital culture and media networks, non linguistic art, emotional design and engineering, networked art and design, fuzzy computing and applications, computer animation, and non realistic graphics. Students choose relevant courses based on their own training plans; At the same time, students are encouraged to choose relevant courses across majors and colleges according to the training plan.

Assessment system

Assessment is a major key issue in subject development. Cross disciplinary talent cultivation is different from a single assessment method, it must be multi-dimensional. It includes two levels: the hard level and the soft level.

The hard layer mainly focuses on the requirements for the paper. Doctoral training is an advanced stage of talent cultivation and must be strictly required. Therefore, students in this discipline must meet the requirements of the school and the discipline, publish multiple academic papers in the first level journals recognized by the discipline, and the papers are indexed by SCI, EI, SSCI, etc; At the same time, the graduation thesis should also reach the level recognized by the supervisor.

At the soft level, this discipline requires students to participate in domestic and international academic exchange activities, or hold academic lectures, hold academic reports on related research, improve academic level, and enhance communication between different disciplines.

Establish a mentor group and strengthen the construction of the mentor team

In terms of graduate training, the vast majority of higher education institutions and research institutes in China still adopt the method of having one expert professor lead several graduate students. This situation often leads to a narrow perspective for graduate students, and may only pay attention to the theory of one school, neglecting the exchange of theories between different disciplines, which is not conducive to cultivating interdisciplinary talents.

In the field of digital art and design, we are actively exploring the form of cross school, cross laboratory, and cross disciplinary mentor groups. The same doctoral student is mainly trained with one supervisor, accompanied by one or two associate supervisors in related fields or cross disciplinary fields, to achieve multi-channel cultivation of graduate students. Through years of practice, it has been proven that this method is feasible.

External communication and cooperation, expanding training channels

Since its establishment, the discipline of "Digital Art and Design" has established cooperation mechanisms with the School of Design at the Hong Kong Polytechnic University, the Institute of Computing at the Chinese Academy of Sciences, the Industrial Design Research Institute at Northwestern Polytechnical University, the Institute of Sports Science and Technology at Zhejiang University, and the Psychology Laboratory at Zhejiang Polytechnic University. It utilizes its interdisciplinary advantages to cultivate interdisciplinary senior talents.

This discipline has established a joint training mechanism with the Hong Kong Polytechnic University, achieving a cooperative training between the two universities and a degree granting mechanism from Zhejiang University. At present, there are three doctoral students under joint training in this discipline, and one has graduated.

In addition, the Intelligent CAD and Digital Arts Professional Committee of the Chinese Artificial Intelligence Society and the Secretariat of the Computer Animation and Digital Entertainment Professional Committee of the Chinese Image and Graphics Society are both located in the School of Computer Science, Zhejiang University. In October 2004, they hosted the "First Intelligent CAD and Digital Entertainment Academic Conference" and conducted relevant discussions in the fields of computer technology, art design, intelligent CAD, etc. The establishment of these two specialized committees will play an important role in promoting the development of this discipline. At the same time, the 5th International Conference on Computer Aided Industrial Design and Conceptual Design, hosted by the Institute of Modern Industrial Design at the School of Computer Science, Zhejiang University in 2004, established the theme of digital art and design, explored the development status of this field, and decided at the conference to establish this related topic at each subsequent conference.

4.3.2 TouchDesigner course innovation practice teaching

The course schedule and schedule are planned to cover a total of 54 class hours from March 9, 2023 to March 29, 2022

1-4 class hours; Introduce TD software feature parameters and panels, analyze excellent works.

4-10 class hours; Teach basic operations and module applications.

10-20 class hours; Teach students to complete intermediate visualization data models.

20-30 class hours; The professor completes a comprehensive TD work with a certain level of difficulty and creates it based on the aesthetic thinking of the student's major.

30-50 class hours; The course incorporates interactive elements (based on students' learning status) to guide students in creating based on the direction of experimental art.

50-52 class hours; Summary and comments (interspersed with excellent work analysis throughout the course, each group or student collects data for course design, uses TD visualization software and tools, and independently completes a data visualization case with aesthetic and practical significance).

Course direction (1) focuses on digital creation, with works combined with video editing to form a complete visual work. (2) Everyone has a different understanding of TouchDesigner, and corresponding creative methods and themes should also be different.

Course task (1) Systematically and comprehensively explain the TD software program to form a practical and sustainable development lesson plan. (2) Enable students to learn visual thinking language through graphic programming software. (3) Cultivate students' ability to independently develop and create interactive works, as well as their teamwork skills.

Course difficulty: Overall, the difficulty of the course is relatively high.

Implementing a view framework is relatively easy, and the connection between frameworks is irreversible. Adding functions may encounter conflicts, requiring repeated debugging and finding solutions to solve them one by one.

To fit the data into the view, it is necessary to process the data and extract, filter, and modify the original data according to the requirements, which can be challenging. Advantages: Utilizing a small amount of data attributes to deeply mine out many new and valuable information; Using multiple views to associate multiple data attributes at the same level; The interactivity of each view and the interactivity between views can be deeply explored. Disadvantages: Due to the fact that the teaching target is second grade students, considering the teaching effectiveness and students' acceptance ability, this course design did not fully utilize the original data, and I believe the breadth of the design is not perfect.

Through continuous learning and observation, other universities have also offered TD courses. The student works are similar to the workshops offered by our school before, and the works are very creative. The current problem is that students have a serious tendency to use examples without modifying nodes as their own works. I have seen many students' works on the internet. In the past and this teaching, we still adhere to the principle of student subjectivity, strictly control the works, and leverage

the advantages of students' videos and graphics for secondary creation with interactive works, aiming to achieve the desired effect.

The results of this course successfully demonstrated the diverse creative direction of touchdesigner and explored its development space. Students not only created according to their majors, but also broadened their creative thinking. The teaching was based on experimental art, interdisciplinary research as the operating method, and innovative thinking as the ideological guidance. All students completed the course requirements and achieved ideal teaching results, This course has been recognized by professionals and school leaders.

Figure 40 Classroom photos
Source: Classroom photos

4.3.3 Exhibition of works

Personal work: The name of this work is Unstable Images. The creative approach of this work follows the practical concept of this study. At the beginning of the work, Touch Designer was used to build the basic images, and then the corresponding videos were saved through parameter modifications one after another. The videos were then imported into AE software for secondary creation, and finally

output through images and projections, this creation was selected for the Shenyang Link Art Program and participated in the exhibition.
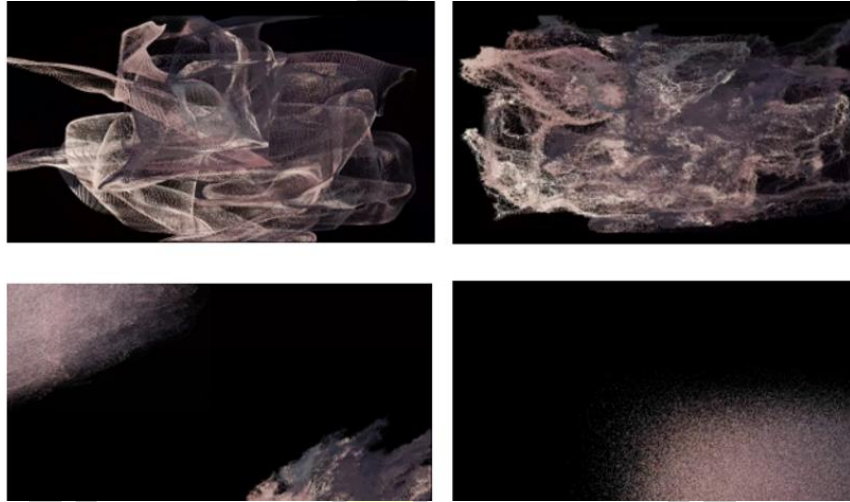

Figure 41 Unstable Image

Source: Personal Works

Figure 42 Video QR code

Student works: Students have also followed the guiding principles and practical concepts of this research in the application of the course. They have applied this practice more thoroughly in their creative applications, as each student has different learning extensions and is exposed to different disciplines. Based on each person's different understanding of creation, they have also created various styles of works, It also overcomes the problems that arise in Touch Designer creation.

The creative concept of the work "Beautiful New World" stems from a negative and skeptical attitude towards the emerging concept of the "metaverse". I believe that the impact of the Internet on humanity today is not enough to make it a place for the spiritual world of human souls. Even if it becomes such a place one day, I do not believe that it should be measured by the scale of capital. Even if it is not measured by the scale of capital, leaving the flesh in reality to rot is not a healthy way of life. Human beings are so arrogant that they have already embarked on the journey of creation, and little is known about the real universe. Where will the metaverse created by humans go?The first head in the video is a profit seeking fool, speculating to make a bet in the world of the metaverse. The second head in the video is a pioneer, unknown to sight, hearing, mouth, and speech. They established the metaverse, but we do not know their intentions. The third head in the video is a mutilated person, with a decaying body and a decaying spirit in the new exploitation of the internet.

I am a huge fan of the Shell Attack Mobile team. The music cited in the video is the theme song "Fly with me" from "Shell Attack Team SAC_2045", and I believe its lyrics perfectly illustrate my view on the metaverse.
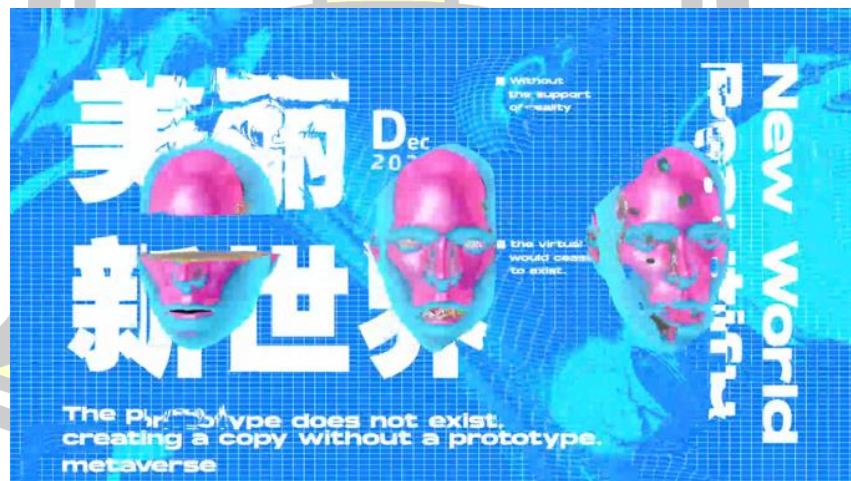

Figure 43 Shell Attack Team SAC_2045

Source: Student Homework

Figure 44 Shell Attack Team SAC_2045

Source: Student Homework

In the context of the metaverse era, we allow spirit to enter the metaverse and gradually migrate towards the virtual world. Meanwhile, in the real world, our bodily functions continue to operate. With changes in cognitive perception, heart rate fluctuates, blood flows, and cells metabolize.

Starting from the sinus rhythm of the heartbeat, this work explores the close connection between human thinking and body in the metaverse era, and completes the visualization of body functions under the stimulation of thinking.

Figure 45 Video QR code

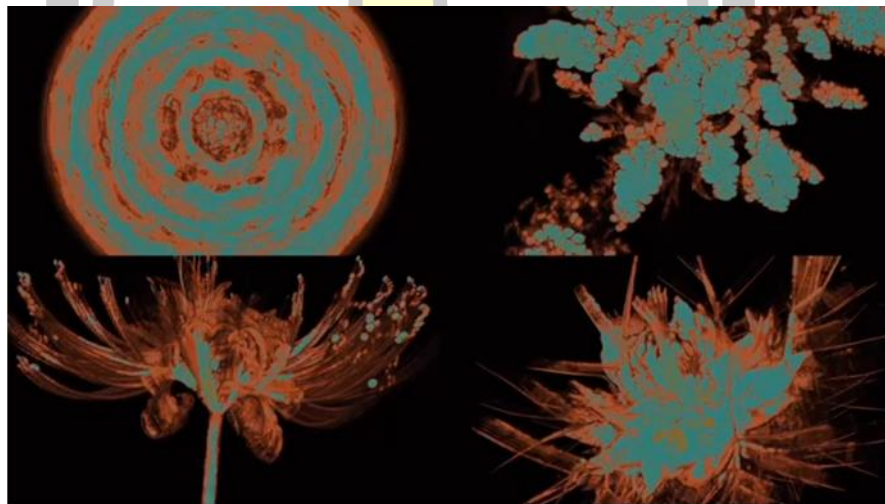Figure 46 The sinus rhythm of the heartbeat

Source: Student Homework

Figure 47 Signal Disqualification

Source: Student Homework

The inspiration for 'Signal Disqualification' comes from the days without the internet. If the source of the internet was the hamster pedaling the wheel, then once the hamster was tired and went on strike, the internet would fall into a state of paralysis. Even with the paralysis of the internet, species had already evolved, such as giraffes pulling their necks long to find signals, or humans having to hold up their phones and look up to find signals, That's how they evolved into bipeds. The entire work adopts a minimalist style, with lines as the main focus and clean visuals. With

black humor, it imagines how the world will react to it after the internet is disconnected.

Figure 48 Video QR code

The inspiration for the work comes from a very popular emoticon pack - when God creates humans, the cartoon image of God in the emoticon pack adds various.
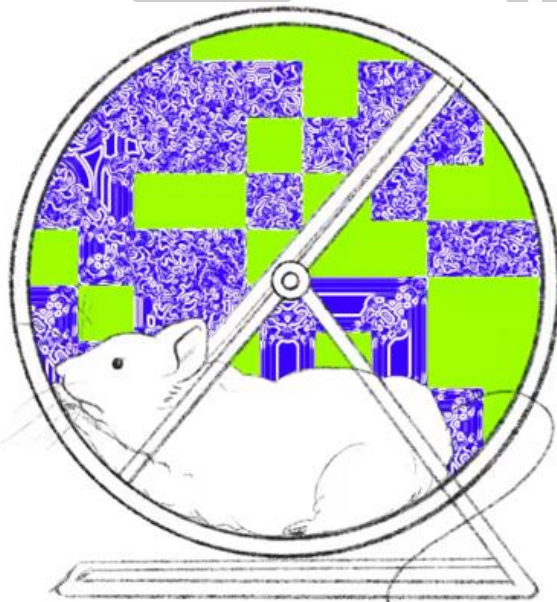

Figure 49 mouse

Source: Student Homework

Elements to our souls in a certain proportion, such as cuteness, talent, humor, strength, etc. This work is an extension of this emoticon pack and also a collection of popular culture and the metaverse. The work is mainly interesting and adopts a collage style as a whole. During the production process, the touch designer's flowing effect is used to represent different types of soul additives in God's hands by changing different colors. However, in the end, God accidentally knocked over the glass cup, which also dissipated the "hope" he had originally intended to add to the human soul.

Figure 50 Video QR code

Figure 51 Hope

Source: Student Homework

Figure 52 Hope

Source: Student Homework

Flowing material forms are ubiquitous, or gaseous or liquid fluids surge and blend with each other, yet beneath their flexible and ever-changing appearance, they can imply immeasurable power.

The work mainly utilizes various fluid forms created by Touch Designer, divided into four small segments: flow, tumbling, absorption, and surging, gradually presenting the power of fluid surging.

Figure 53 Video QR code

Figure 54 Various fluid forms created by Touch Designer

Source: Student Homework

Figure 55 Various fluid forms created by Touch Designer

Source: Student Homework

The gravitational singularity is a "point" referred to in the Big Bang cosmology, which is the starting point of the "Big Bang". There is a theory that the universe (time space) expanded and formed after the "Big Bang" of this "point". Scientists believe that a singularity exists at the center of a black hole, where its

density is infinitely high, spacetime curvature is infinitely high, heat is infinitely high, and volume is infinitely small. All known laws of physics fail at the singularity.

The fluid and abstract geometric forms produced by TouchDesigner are presented in split screens, and the centers of the two images are influenced by a constantly changing but invisible gravitational singularity, which also affects and connects each other.
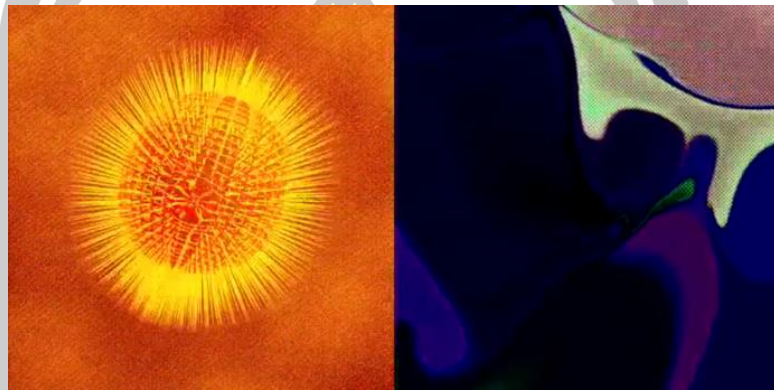

Figure 56 Point

Source: Student Homework

Figure 57 Video QR code

Figure 58 Gravitational singularity

Source: Student Homework

Wind is born, water rises, tide surges, ethereal, condenses, dissipates... Between the seas, only water is the best. To be pure to pure, to be simple to light, although colorless and tasteless, it moistens all sentient beings. The work is titled "Water" and uses the halo dyeing effect to depict various forms of water, gathering them to form clouds and rain, and transforming them into tangible water; Scattered without a trace, drifting between heaven and earth. Amidst the halo of water color, all things benefit from its nourishment, showcasing the essence of water's purity and goodness.
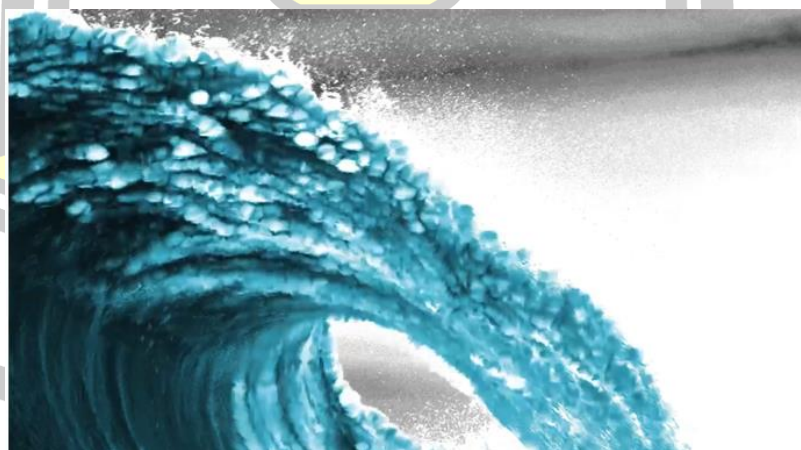
Figure 59 Water

Source: Student Homework

Figure 60 Water 2

Source: Student Homework
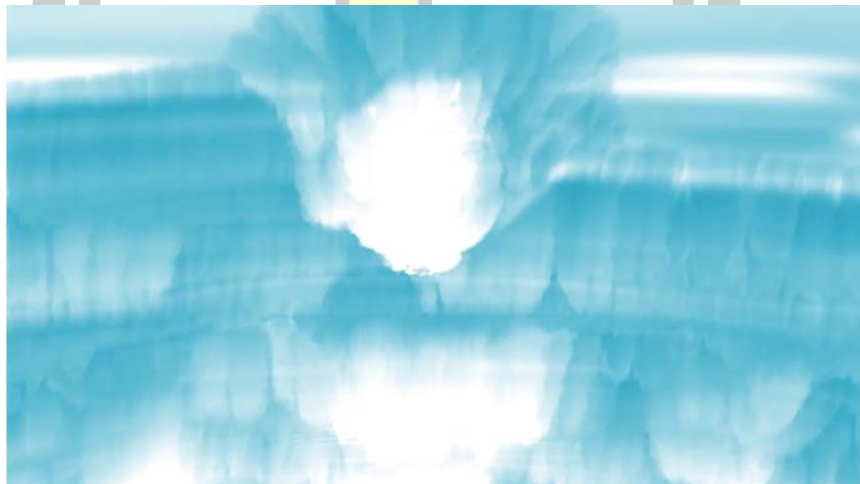
Figure 61 Water 3

Source: Student Homework

      Fantasy Metaverse. The metaverse is a virtual space that can map the real world and is independent of the real world. Launch another 'real life' in the virtual world. NFT is a manifestation of digital asset credentials in the original universe, and it has gradually evolved with the development of the metaverse. Perhaps from physical assets, artworks, commercial creativity, intellectual property, to personal Weibo, social media, videos, games, photos It seems that everything in the real world can be connected to the blockchain world through NFT. That is to say, the metaverse will become the best container for NFT. How can we digitally transmit real-world

material data to the metaverse through NFT? What will the transmitted material data look like in the metaverse world? We mainly utilized the noise and intrusion functions of Touchdesinger, combined with Glitch Fault Art and Generation Y pixel style, to conduct a small visual exploration.

Figure 62 Video QR code
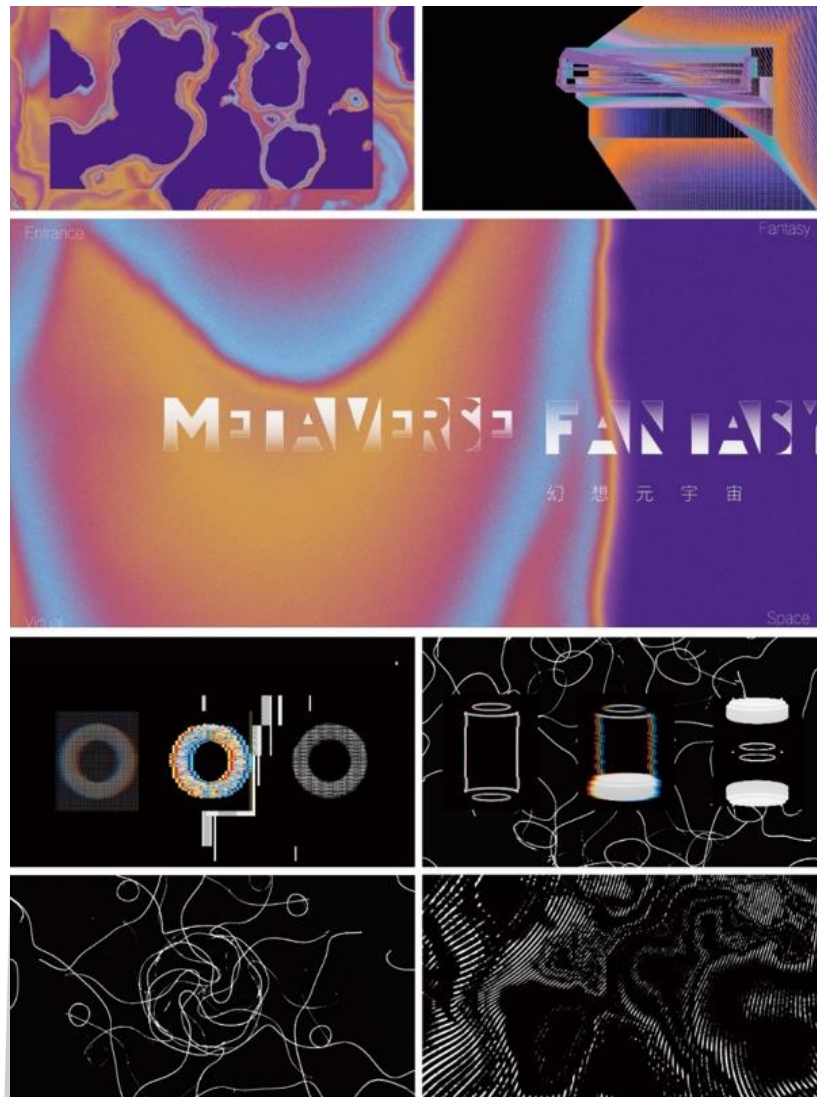
Figure 63 Glitch Fault Art and Generation Y pixel style

Source: Student Homework

This work is inspired by the negative spacetime conjecture in "The Soul Cage", which means that the surface and interior of positive spacetime exchange. Under this assumption, the source of human life in the universe, that is, the soul, collapses on the spine to form a insect like spine. Therefore, under this concept, the egg forms a replacement with amber.

Eggs and amber, positive and negative, the origin and end of life. So the beginning of human life in negative spacetime is like an amber, corresponding to an

egg in positive spacetime. The destruction of positive time and space, the beginning of negative time and space, is like the totem of the serpent.

So in the entire set of works, amber represents the newborn human race, presenting different noise effects in three stages: from the most primitive perception, from perception to self doubt and questioning or compromising the world, to ultimately adapting to changes made by society and the times. Just like the Hindu concept of 'supreme self' and the Taoist concept of 'unity of heaven and man', I believe that humans themselves are also a universe, from perception at birth, to change, and then to characterization. However, as people age and become aware of their destiny, their perception of the world will gradually return to its original state of perception, which is the Ouroboros of the universe.

No matter how the egg changes, it will still belong to the egg; No matter how one changes, it will still belong to one. So, enjoy the change, whether it's good or bad.
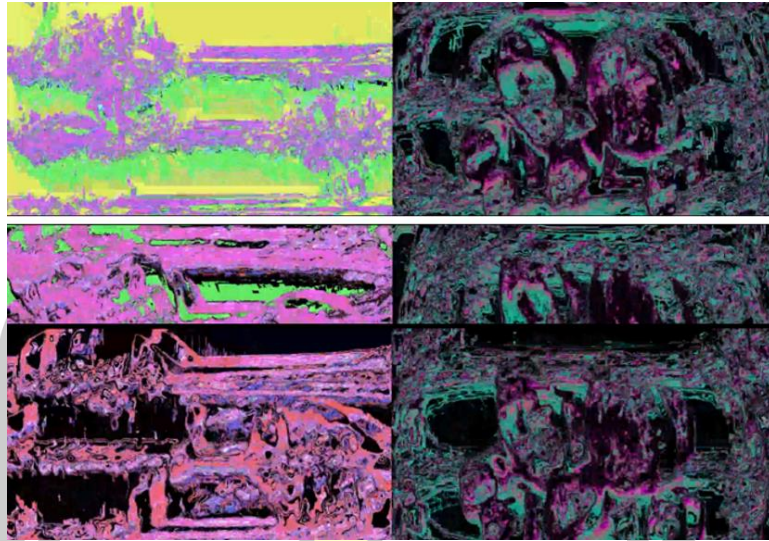
Figure 64 Video QR code

Figure 65 The Soul Cage

Source: Student Homework

4.3.4 Creative Practice Evaluation

The uncertainty and diversity of TouchDesigner art are being driven by the rapid advancement of digital technology, leading to a complete breakdown of previous communication and aesthetic concepts. People are no longer satisfied with passively receiving information, but are pursuing a democratic, interactive, and diverse experience. The creation of TouchDesigner's image art should dispel people's secular concepts and perspectives, and through creative practice, trigger audience perception, interaction, and experience, thus providing people with a new way to observe life. TouchDesigner's visual art works should not only meet people's aesthetic demands or needs, but also reflect social and cultural relationships and their own development - this is not only the goal pursued by creation, but also constrained and influenced by it. Therefore, when evaluating the practice of digital image art creation, the evaluation can be measured from several perspectives such as the aesthetic value, social efficacy, and innovative development of the work. New aesthetic values, new artistic concepts, and new artistic forms will inevitably bring new aesthetic methods. From the beginning of Duchamp's "Urinals", modernist concepts broke the boundary between daily life and art, greatly expanding art and aesthetics. Traditional images, whether in form or content, have clear boundaries and are relatively closed and

inaccessible. The aesthetic subject and object are also very clear. In the past, the aesthetic perception of images was a worship based observation, which involves contemplation, contemplation, or observation, as well as self imagination, in order to obtain a certain artistic feeling or receive some kind of enlightenment from the work. The trend of postmodernism has also led to the development of art from elite culture to popularization and popularization, and people's aesthetic concepts have undergone significant changes. They are no longer pursuing abstract sublimity or eternity, but gradually transforming into seeking to obtain a certain experience or a popular consumption. This also makes the aesthetic expression of digital images diverse and uncertain. The virtual features of TouchDesigner images, especially with the unprecedented development of the internet and mobile networks, and the intervention of artificial intelligence, have enabled TouchDesigner image art to break through the previously closed boundaries, eliminate the inherent aesthetic temporal and spatial forms, and enable it to be created, displayed, and participated in anytime, anywhere. The traditional value of "beauty" has been shattered, and its connotation has also been infinitely extended, with greater inclusiveness. People's pursuit of 'beauty' is no longer a form of spiritual restraint, but rather a form of spiritual exile, a comfortable feeling that can be experienced. This also makes the visual relationship between the audience and image art complex and trivial, and the aesthetic of images becomes diverse and decentralized, with a strong postmodern color. People no longer passively accept, but rather hope to gain self-awareness through game like interactions, or to experience new feelings that even creators are unaware of through direct participation. It can be said that the entire aesthetic process is not only a process of visual experience, but also a process of discovery and creation. On the other hand, in today's world where powerful digital technology is almost omnipotent, the infinite replicability of digital art has led to a further 'disenchantment' of art by technology, as well as a lack of artistic spirit pursuit in the context of marketization and popularization. "Technology has broadened the boundaries of TouchDesigner images, but it has also made images overly focus on novelty in form and visual stimulation, making it easy to overlook the value and significance of the work itself. This also causes creators to focus solely on creating more spectacular visual effects or showcasing the use of a new technology. Any excessive visual stimulation can numb and annoy people, and even the most

innovative technologies and forms can become outdated and outdated. The development of things should be within a certain range, otherwise it will also be too much. In TouchDesigner art teaching, I try my best to correct this problem, allowing students to leverage their strengths and avoid their weaknesses. Through my own teaching, I make students realize that this excessive fast-food style of visual imagery can naturally bring a certain sense of boredom to the audience, just like living in a bustling and bustling metropolis for a long time has begun to shift towards a simple and authentic rural life, The excessive development of things inevitably leads to a certain degree of humanistic return. This return is worthy of recognition and guidance, as it actually conforms to the spiral development law of things.

At the end of this chapter, the author cites a speech by Donald Welch to wrap up the teaching process.

Speaker Introduction: Director of the Design Department at the Queensland School of Fine Arts, Griffith University, Australia. He is a professional designer in the field of visual communication design and has unique insights into printing art. He is a professional consultant at Minar Bryce Design Company. His research areas include providing bottle label design for small and medium-sized red wine manufacturers through online surveys and production maps. At the same time, he is committed to cultivating creative thinking and has initiated and taught the "Creative Thinking" course in the past five years. Summary of speech:

Donald Welch, Director of the Design Department at the Queensland School of Fine Arts at Griffith University in Australia, delivered a speech titled 'Teaching Creative Thinking in classes'. His eloquent speech and cited explanations undoubtedly made him the most eye-catching focus of the audience.

The key points of his speech are as follows:

1) Creative thinking requires continuous practice to reach a considerable level. Although the process of practice is full of hardships, the gains are accumulated over time. Theory and practice are two different things, and creative thinking requires finding the most suitable method for oneself in order to achieve the most satisfactory results with half the effort and the least amount of time.

2) Presented some students' works to emphasize the importance of accepting new things, and demonstrated in detail the efforts and achievements of the Design

Department of Queensland Academy of Fine Arts in cultivating students' creative thinking from the perspectives of teachers, specific teaching methods, and teaching management.

3) Discretionary nature is a crucial component of creativity and a very favorable factor. To truly be creative, one must abandon established procedures and not be bound by habitual thinking. Discretionary and perceptual steps are more conducive to creativity. Specific speech content;

At the end of this chapter, the author cites a speech by Donald Welch to wrap up the teaching process.:

It is a great honor to be invited here to give a speech to everyone, and I am also very grateful for everyone's enthusiasm. I am going to talk about teaching creative thinking today. In the process of teaching later, I hope everyone can also participate in this process. In fact, the teaching method of creative thinking should be very interesting. In fact, creative thinking requires continuous practice, just like riding a bicycle. The process may be very painful and difficult, but after trying again and again, suddenly you learn to ride a bicycle without realizing it. Of course, before learning how to ride a bicycle, we will learn a lot of theories, but really

Just about to learn, you have to try it yourself.

Everyone may remember that the first time they tried to learn cycling, they must have fallen. So theory is one thing, and practice is another, just like learning bicycles, we need to learn through practice. When I teach this course, I combine theory with practice. My goal is to enable students to apply what they have learned, integrate these methods into their lives, and often apply them to their practice. But we need to know that there is no simple and uniform method for creative thinking. You can only find your own method, because methods that may work for others may not be effective for you. Our main assignment for this course is creative work. Why do you need to do these homework? Because we believe that creativity must be learned through specific practices, including movies, 2D, 3D design, painting, dance, and more. Next, I will show you some demonstrations of student works. If you want to be a creative person, you must learn to appreciate how I am now and learn to relax yourself. Throughout our entire teaching activity, classmates in the entire class often engage in many activities, sometimes appearing silly, to help them stimulate new

ideas and broaden their thinking. We will have a variety of forms, including role-playing, word games, painting, and so on, so our focus is on doing. It is very important to have different enlightening effects on our thinking and learn to use different methodsThink.

Linear thinking (left brain thinking) is very narrow and boring. To achieve creative thinking, we must use a completely different method to achieve this goal, which is randomness, which is a very advantageous element in the creative component. Admitting this arbitrary power means abandoning established procedures and this linear thinking. I believe that the steps of randomness and intuition are more conducive to generating creativity, and I will also spend a lot of time discussing with my students how to introduce this randomness into innovative thinking methods. You can see this sentence: Ships in ports are safe, but the purpose of building ships is not to make them safely stay in the port. Everything depends on whether the ship can travel normally after being launched.

This is the homework created by a photography student for his Creative. He took a street register and read it from beginning to end, dividing the place names that appeared in the book into different categories based on nouns and adjectives. Then he randomly selected some place names from them, selected them according to different parts of speech, and formed a sentence. Then he went back to find the places represented by the words in these sentences. After finding a specific place based on these place names, he took a photo of the place and then used these photos to form a sentence for the photo. This is the final finished product that we can see from him. As you can see, the sentence he finally picked out may be a bit absurd. If you are interested, you can go back and carefully check it out. Literally, it reads: the little green emu of the Boulevard Boy, the woolly cheetah hunting for a crazy employer. This is the origin of the words in the sentence we just saw, and each word has its true origin. This is how he passed this

A visual sentence created after a series of creative ideas.

The following are some reflections of students on their own works. This activity reflects randomness, which is actually like a journey without knowing the outcome. Only you know the process, and each time you make different changes, the results and discoveries are your own. According to this course, students will also be

required to perform different group demonstrations, and the spirit of adventure is the most important criterion for this

Here is another example of our student's homework. At the beginning, we will provide students with some pictures, with ducklings and flowers painted on them. The outline of the ducklings has been marked, and this process does not require much brainpower. The task is to have students fill in the colors of these pictures, which have been marked in their lowercase letters on the pictures. All you need to do is fill them out. This is when the student was coloring the ducks and flowers. This is the effect of painting out the image in the initial stage.

Further students are required to engage in more diverse and challenging activities, with the aim of allowing them to broaden their thinking and express themselves boldly. Here, just like the previous step, the word 'duck' and 'flower' are also given to everyone. However, this time, different materials can be used to express your final product according to your different understanding of these two words. You can use 3D materials, including clay, space tube strips, and some colored paper to achieve your own work. This time we can see that the results of student works are very different. And from the same comparison, both of these two times provide a comparison between flowers and ducks

The two words' zi ', but the results are vastly different.

This classroom practice was actually very successful, and it was also a very systematic and organized group assignment. Not only were the students taught how to apply these creative thinking, but they actually did it themselves and successfully achieved the goal. There is also a non specific way of describing things. This time, the students in the class were divided into different groups, and each group would randomly give them a card with a word or phrase written on each card. They would be asked to search for as many things as possible related to the words on these cards, whether through a dictionary or a vocabulary search. Because the meanings expressed by individual words and phrases are very concise, only some of the most basic elements, this allows you to have the opportunity to extensively explore the meaning represented by this word or phrase, and try to find the implicit meanings associated with the sentence, or some words associated with it, which may generate many incredible or very bold possibilities.

In many cases, what we often ask students to do is to give them a problem and ask them to find a solution to the problem. This time, instead of giving them the problem, let them find a solution first. This way, their thinking will be much broader and their limitations will be much less. After completing the word association activity on one side of the card, they were asked to flip the card over and write the name of the product or service on the other side. This time, they must make a development or promotion plan for these products or services. Now we can know that this skill can actually be utilized in practical work environments. The most important thing is to condense the different requirements of the product into a single dictionary or phrase, which is almost achievable. A good example of this is Wells, a British brand master who was once invited by European Airbus to provide a clear definition of the L380 aircraft. Compared to the Boeing 747, the L380 appears more economical, safe, spacious, and environmentally friendly. This master spent six months discussing some issues with corporate decision-makers, politicians, and ordinary workers, and then found the final answer. His slogan was to kill Boeing. It is very important for us to have a simple and clear definition of the meaning that this product aims to convey.

At the same time, we see that creative thinking is easily disturbed by things, such as emotional and cultural barriers. Emotional disorders include fear of making mistakes, fear of failure, fear of taking risks, or inability to tolerate uncertainty. Cultural barriers: taboos, fantasies, and thoughts are a waste of time, even laziness, and even madness. Moreover, mischievous behavior is only a matter for children, and problem-solving is a very serious matter that cannot tolerate any humor. Good concepts are such things as rationality, logic, numbers, utility, and practicality, while feelings, intuition, and pleasure are all bad. Creativity means insurance.

Below is another student assignment, which completes an impossible transformation in his student assignment. What he wants to do this time is to create a brand without products. He wants to try and see if there is such a possibility to create a brand that does not have specific products. He calls this brand 'need', and many consumers are not based on actual needs, but only on brand reasons. He decided to use a card that could be collected to promote his brand. Although this brand does not have a product, collecting cards itself becomes a product of this brand. This is the need sign he created, with slogans expressing different ideas on the card. This card

always stimulates your desire for such needs, but it does not specify what you need. Through this series of works, it may fully reflect a mentality under consumer culture. This is various, and the content expressed on each one is different.

This section discusses problem-solving. We first need to recognize the concept of how to clearly define a problem, which is often more important than its solution and is also a more creative activity. Finding problems not only involves finding problems that have not been defined before, but also redefining problems that have already arisen. Your definition of a problem will affect your ability to solve it, and you may find that when you change your definition of a problem, the difficulty of solving it may also change.

How can we redefine a problem? Not verbally speaking about this matter, but through visual means, or by presenting the issue in a different form, but instead using a metaphor. By doing so, we get not only a very mediocre result, but also a very creative result. Because through the use of language, one can view, think about, and feel things in different ways. For example, it can be said that when I am cold, I am almost frozen, or I am just a piece of ice. For example, when I express the concept of being very hot, not only is it hot, but my whole body is boiling or almost melting, which is a metaphorical method.

Here are some key elements: first, being casual, relaxing, and living in your current thinking; second, being fun and humorous, because seriousness will definitely stifle creativity. This is the process of brewing thoughts in the brain, which will give you a period of time to make your ideas more mature. And intuition, you may not need to have too much knowledge, and ideas will jump into your mind. Doing nothing and only doing something requires a lot of adventure. If you find that you can't always find the right solution to a problem, the problem is actually that you're just thinking about how to solve the problem, and in fact, you have to take the initiative

Find a solution.

The following are very practical suggestions: be spontaneous, have a subconscious to believe in yourself, give your logical thinking a break, and have a thorough understanding of the problem before solving it, because creative results often rely on your rich knowledge. Of course, in order to express your creative thinking, it is also very important to learn some basic and necessary techniques. It's

not just about solving problems for the sake of solving them, starting from the initiative of finding solutions. When encountering a problem, don't cling to it and let it go. Let your mind bypass the established path and may find unexpected answers in other new places. As I just said at the beginning, it's time for you to practice. Thank you! (Teaching Creative Thinking by Donald Welch)

Table 4 Research model
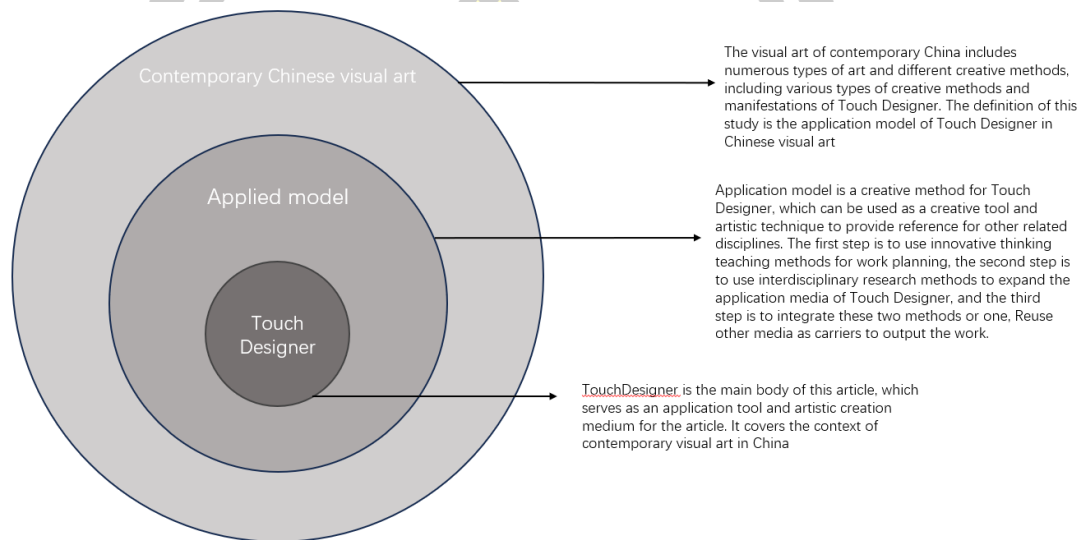
CHAPTER V

Conclusion, Discussion and Suggestion

5.1 Conclusion

5.1.1 The history of TouchDesigner and the development of digital media art in China.

At present, the vigorous development of digital media art in China is an inevitable trend. Nowadays, domestic talents engaged in digital media art and design are becoming a new group with great development potential in the job market. As a branch of the creative industry, with the rapid development of the creative industry, its vast development space is attracting a large group mainly composed of young people. According to data statistics, in 2005, the number of young creative talents in China exceeded 3 million. At present, the digital media major is already the major with a relatively large number of students enrolled in disciplines in Chinese universities. However, there are only a few schools that offer the digital media art major, and even if they do, the quality of their education may not be guaranteed. After the author's research, it was found that this is mainly due to the serious lack of truly professional teaching staff. Overall, there is still a significant lag in digital media art and design in China compared to advanced countries in Europe and America. Fundamentally speaking, the bottleneck in the development of digital media art in China is the lack of talent. Professional digital media art designers and educators are the absolute prerequisite for educating and cultivating Chinese digital media art and design talents. Only with a large number of qualified digital media art designers can China's digital media art and design, and even the creative industry, develop quickly and well.

The potential consumption capacity of China's cultural market is very huge, and industries closely related to its development, such as news publishing, film and television broadcasting, audiovisual, entertainment, advertising, etc., are also flourishing. Therefore, the corresponding phenomenon of talent shortage in industries is becoming increasingly prominent. And Touch Designer digital media art design is a very important aspect. Whether it is animation, film and television, entertainment, or

news publishing, there are countless connections between digital media art and design. The current situation is as follows: (1) There is a shortage of practitioners, especially qualified practitioners, far from meeting practical needs, and resulting in a low overall level. At present, the proportion of people engaged in Touch Designer digital media art and design in China is less than one thousandth of the total employed population, far lower than in countries such as Europe and America. (2) Due to the late start of Touch Designer's digital media art design in China and the lack of a large amount of practical materials, there will inevitably be many obstacles in talent cultivation. For example, graduates are unable to better meet the needs of enterprises, mainly because design education continues to use traditional education methods, neglecting the characteristics of design education that should keep up with the times and combine with practice. As a digital media art design platform based on new media, there are inevitably many differences between it and traditional design education. In some countries with developed digital media art and design education abroad, 90% of their professional teachers come from the market. (3) Touch Designer digital media art and design talents should have comprehensive literacy in multiple disciplines, such as graphic design, animation, advertising, projection, and even sociology, psychology, etc. However, domestic education often relies on art colleges, and under the old thinking mode, it will inevitably have significant obstacles to Touch Designer digital media education. (4) There is an imbalance in the composition of talent in digital media. Professor Fan Zhou from the Cultural and Creative Industry Research Center of Communication University of China said, "The creative industry involves more than a dozen industries, and the imbalance in talent composition is quite prominent. For example, the media industry has developed relatively early, and talent is currently relatively saturated. However, emerging industries such as animation and gaming are relatively lacking in talent." The above is a summary of China's digital media art development and Touch Designer art

5.1.2 The Application and Problems of TouchDesigner in Current China

Experienced artists and software workers with rich professional knowledge can use Touch Designer to create excellent works in the application of TouchDesigner. However, for most art practitioners and students, there are many problems in the application, as mentioned in the article,In the past, Touchdesigner's

visual art has always been regarded as an imitation of real life, and has formed an aesthetic concept centered on formal aesthetics. Since society entered the post industrial era, it has evolved into a knowledge and information society. With the rise of postmodernism, significant changes have taken place in social culture and art. With the rise of popular culture and the prevalence of consumerism, the trend of democratization and decentralization in society has become increasingly evident, and people's ideological concepts have also undergone dramatic changes. Art has gradually transitioned from elite to mass, as well as towards life. Aesthetics have become more popular and entertaining, emphasizing processes and experiences, and transitioning from 'meaningful' to 'interesting'. For Touchdesigner's image art, with the intervention of digital technology and the influence of postmodernism, traditional analog images based on physical and chemical properties have transformed into digital, informational, and virtualized digital images. In this process, the connotation and extension of image art have undergone significant changes, bringing not only technological progress but also formal changes, It also directly changed people's perception of images. The digital transformation of image art is first manifested in the form of language based on technology. This language is different from traditional art in terms of imitation and plagiarism. Currently, TouchDesigner digital media art often appears, which needs to be taken seriously. The development of computer technology and the advancement of graphic and image technology have made the ability of computers to process images increasingly powerful and intelligent. People are no longer satisfied with the general modification and modification of images, but instead use images as a basic medium to develop in a more diverse and intelligent direction. At the same time, the popularization of network technology, especially mobile network technology, has brought broader space for the digital survival and dissemination of Touchdesigner images. Currently, Touchdesigner digital imaging has been deeply integrated into our daily lives, and it is also difficult to distinguish between imaging and interactive imaging art. This transformation process is not achieved overnight, but rather has a certain logical sequence.

5.1.3 Building an Application Model for Touch Designer in Art and Learning

（1） Actively building a comprehensive teaching staff

Touchdesigner Digital Media is a new discipline that requires more professional teachers in the process of curriculum system construction. These teachers should not only possess comprehensive professional knowledge, but also possess corresponding artistic cultivation. In addition to ensuring that students learn professional digital media knowledge, they can also improve their artistic abilities through the guidance of teachers themselves. Colleges and universities should actively utilize their educational resources and build a teaching team of full-time and part-time teachers. Firstly, in the process of building a full-time teacher team, it is necessary to improve the professional abilities of teachers, and through the guidance of subject leaders, educate and train the digital media professional teachers of our school, so as to form a reasonable knowledge structure for the entire full-time teacher team. At the same time, it is necessary to actively build a comprehensive teaching team and develop young teachers with strong work ability, high work enthusiasm, and high professional quality. We should focus on cultivating young teachers as subject leaders in our teaching, and follow the principles of fairness, impartiality, openness, and efficiency. By introducing high-quality talents from universities, self cultivating schools, and supplementing teachers, we should establish a comprehensive team of digital media professional teachers in universities, ensure the efficient utilization and distribution of teacher resources, and build the digital media profession into a rational talent cultivation system with excellent professional skills and artistic abilities of teachers A major with significant teaching effectiveness. In addition, universities should provide opportunities for further education and learning for their teaching staff, strengthen their extensive cooperation with digital media enterprises, actively guide their professional teachers to engage in training and internships in enterprises, and actively encourage the majority of professional teachers to try teaching reform and do a good job in scientific research; Secondly, in the process of building a part-time teaching team, it is necessary to fully leverage the advantages of the regional digital media industry, and combine the teaching tasks of universities to recruit a large number of part-time teachers from enterprises. On the basis of improving students' learning ability, it can also further expand their thinking ability, improve their practical and creative abilities.

（2） Actively building and improving the teaching system of Touchdesigner digital media courses

Colleges and universities should utilize the school's well-established teaching system and educational resources to organize professional teachers to develop scientific and reasonable talent training plans, providing corresponding theoretical basis for the integration of software and art disciplines and the construction of cross disciplinary scientific teaching systems, in order to actively build the Touchdesigner digital media professional curriculum system. In the process of student education, it is necessary to continuously strengthen the collaborative development of students' professional basic knowledge, application ability, and practical ability, in order to ensure that students can have a comprehensive theoretical knowledge and practical ability in digital media, and ensure that their ideas can be better expressed through computer technology, fully reflecting the teaching concept of integrating art and technology. In short, in the process of constructing the Touchdesigner digital media professional curriculum system, the primary goal is to improve students' learning ability, ensure that students fully grasp basic knowledge, highlight the artistic and technical characteristics of digital media professional courses, scientifically set up major courses, do a good job in computer software teaching and art professional curriculum design, and ensure effective coordination between artistic and technical courses in the professional teaching process. In addition, in order to enhance students' practical ability and creativity, and enable them to better apply the knowledge they have learned to practical work, it is necessary to actively engage in cooperation with digital media enterprises. By allowing students to learn and practice in enterprises, the overall quality of students can be better improved. At the same time, the Touchdesigner digital media professional curriculum system should actively engage in extensive communication and cooperation with other disciplines, apply excellent teaching achievements to professional teaching, and continuously expand students' thinking abilities.

（3） Actively building a digital media professional training base to promote teaching innovation. In the process of cultivating digital media professionals in universities, Touchdesigner should always adhere to the vocational characteristics of vocational education, strictly adhere to the educational philosophy of improving

students' employability, employment oriented, and emphasizing both theoretical and practical teaching. Continuously reform teaching models and methods, and break through the limitations of traditional education, Cultivate students' practical ability and innovative spirit. In the specific teaching process, Touchdesigner's digital media major should focus on the combination of computer software technology and art as its teaching characteristics, continuously optimize teaching practice content, construct a hierarchical practical teaching process, adhere to the principle of combining production and learning education, and actively build a training base that combines technology and art, compulsory courses and elective courses, to build a multi-level practical teaching system. In the process of cultivating digital media professionals, we should adhere to the construction of disciplines based on practical training bases, integrate the educational resources of universities, combine the advantages of regional software enterprises, conduct scientific research through strengthening enterprise cooperation, and strengthen the cultivation of digital media practical talents. In addition, it is necessary to rely on the school's training base to strengthen the construction and cooperation management of digital media and other related disciplines, and cover the practical content of courses in multiple professional fields such as multimedia technology, digital animation, and art design, providing a broader practical space for students majoring in digital media. Through cooperation among various majors, while enhancing the practical ability and theoretical knowledge of the digital media profession, students from other majors can also continuously improve their practical space, innovate their thinking, learn from each other's strengths and weaknesses, and take what they need, greatly strengthening the teaching function of university training bases. This not only plays a certain reform role in the practical teaching of the digital media profession, but also cultivates multi-level Highly skilled digital media professionals ensure that students have higher competitiveness in society.

The communication methods are divided into three basic forms: Touchdesigner digital media perception, representation, and display. According to the design type, they are further divided into virtual reality design, augmented reality design, and artificial intelligence design. They participate in research in these application fields and form the technical guidelines for Touchdesigner digital media

art talent cultivation, which is also a key point in the construction of digital media art design. So a single structure of art teaching knowledge can no longer meet the requirements of the development of the information industry. The cultivation of design ability requires students to adjust the general traditional design learning thinking mode, increase their understanding of information technology systems, and meet the requirements for the application of basic technical abilities. This not only practices formal aesthetic content in the teaching of design majors, but also expands the practice of related technology in the field of professional technology. Teaching theory and design methods are increasingly closely linked to the forefront of technology.

Therefore, we need to strengthen interdisciplinary research, apply interdisciplinary theories, methods, and achievements such as art and design, informatics, and computer science, and comprehensively measure digital media art teaching based on industrial development capabilities. Based on the principles of information theory, systems theory, and cybernetics, we will select representative design projects in the industry for investigation and analysis, and subdivide production and creative characteristics and process flow research. Enable digital media teaching to have the natural genetic conditions of the information industry, break away from the traditional single knowledge model of design teaching, and cultivate the ability to coordinate multiple professional knowledge systems. By planning the application of information technology, expanding and transforming information technology, we can more support the realization of design creativity. Technology without design and application has no practical value, and design without technical support is also an inefficient activity. The combination of art design teaching and information technology is the key to cultivating high-quality digital media art talents.

5.2 Discussion

Discussion on The Value of Digital Media Interactive Art

Digital media art is a new form of art based on the Internet and computers, utilizing technological means to combine rational thinking with emotional thinking. Unlike previous art forms, digital media art is a comprehensive art that integrates

multiple disciplines. Digital media art is the combination of art and contemporary cutting-edge science. Digital technology, biotechnology, quantum theory, economics, linguistics, and others can all become media for achieving art. Roy Ascott, a pioneer of digital media art, said that the most distinctive features of digital media art are connectivity and interaction. Understanding the creation of new media art requires five stages: connection, integration, interaction, transformation, and emergence. Firstly, it is necessary to connect and fully integrate into it (rather than just watching from afar), interact with the system and others, which will lead to a shift in work and consciousness, and ultimately lead to the emergence of new images, relationships, thoughts, and experiences. In the paragraph of this article, the five stages of artistic creation mentioned coincide with the digital media art mediated by Touch Designer, which also has reference value in the development of this art form. The nature and characteristics of Touch Designer itself correspond to the content mentioned in the article.

Digital media art, as an emerging art, has the emotional qualities of art. Artists can use inspiration to enter the imaginative world of art, which not only stimulates people's artistic aesthetics but also enhances the commercial value of art. Commerce also places higher demands on art. In the process of building a harmonious society, economic demand is the driving force for the sustainable development of digital media art and also the driving force for social stability and development. From this article, it can be seen that from the traditional industrial society to today's consumer society, the operation of the social economy is actually based on a balance mechanism between production and consumption. Digital media art often becomes a direct driving force for consumption. Nowadays, many business activities are combined with an increasing number of digital media designs, which will bring greater economic benefits than traditional business models. For example, K11 in Guangzhou, a revolutionary museum retail concept and a hybrid model of art and commerce, has introduced many digital media art works and related artists, such as Olafur Eliasson, Teppei Kaneuji, and Yinka Shonibare. This not only promotes local and international artistic and cultural exchanges, but also promotes the economic benefits of K11 shopping center. In recent years, the country has implemented cultural tourism policies, and digital media art has also shown outstanding performance in cultural

tourism night tours. For example, digital projection programs launched by major amusement parks, 3D projection programs launched by digital media cultural tourism towns, and tourist attractions. The rich and colorful forms of digital media art have stimulated consumers' desire for consumption, and digital media art has undoubtedly contributed to its economic value. At the same time as this economic growth, it also provides an opportunity for the development of Touch Designer's digital media art. As a part of the socio-economic cycle, on the one hand, Touch Designer digital media art must comply with market and economic laws; On the one hand, Touch Designer digital media art needs to continuously create economic value. In this sense, Touch Designer digital media art is also a form of productivity, playing an increasingly important role in promoting social harmony and economic development.

Discussion on Regional Culture and Public art of Digital Media Interactive Art

Public art, as the business card of a city, plays an important role in shaping its unique personality. Public art has become one of the important ways to construct contemporary urban multiculturalism and disseminate public information. Public art, as an indispensable visual art image in a city, records the history of the city and contains its culture. Its design should not only meet the needs of urban public cultural services, but also reflect the regional characteristics and historical culture of the city. Digital media has broken the traditional communication model of a single public art, allowing the audience to unconsciously become a part of the work and interact with it. Digital media, as the crystallization of art and technology, is a direct way of information dissemination and is active in the field of public services. In the UK, the digital media industry accounts for approximately 7.9% of GDP, making it the largest industry; In Japan, industries such as electronic games, anime, and online games have become the second largest after the automotive industry. The domestic digital media industry is also developing rapidly. In recent years, the integration of digital media technology and public art design has become more common. Digital media has a public and human touch, not only spreading diverse symbols, but also providing sensitive feedback and quick adjustments, which has a positive impact on consumer behavior. The public art works of Touch Designer rely on the development of the digital media industry in society. In the cases mentioned in the article, the vast majority of cases can be achieved through the production of Touch Designer, which

means that the public art value of Touch Designer also exists. Currently, there is only a small amount of practical application of Touch Designer public art in Shanghai in China,

In the digital information age, public art design should strengthen its integration with digital media technology. The integration of digital media and public art is conducive to enhancing the fun of the urban environment and enhancing communication and interaction between public art and the public. This interaction is not limited by time and space, and can better reflect the culture of the city, enhance its quality, highlight its personality, and shape its beautiful image. Based on this development, the openness and diversity of Touch Designer will bring highly distinctive artistic forms. Therefore, the role of Touch Designer in public art is worth looking forward to

Discussion on Digital Media Teaching Issues

The article mentions that three-dimensional teaching digital media art is an emerging art form that combines modern technology with traditional art, and is an important component of the digital economy. It is of great significance for building a digital China and promoting high-quality and efficient economic growth. However, due to the fact that the digital media art major is an emerging profession and the teaching mode is not yet perfect, there are still imperfections in the talent cultivation mode of digital media art majors in China, which cannot meet the market's requirements for talents. The reason is that the industry foundation is weak, the connection between industrial technology and art design courses is loose, and the ability of design in the industry is not high. Art and design education often uses isolated and intuitive feelings such as shape and color as the standard for measuring works, neglecting the basic requirements for productivity under the requirements of industrial production. Therefore, I propose the following discussion: Communication methods are divided into three basic forms: Touchdesigner digital media perception, representation, and display. According to design types, they are further divided into virtual reality design, augmented reality design, and artificial intelligence design. Participating in research in these application fields forms the technical guidelines for talent cultivation in Touchdesigner digital media art, which is also a key point in the construction of digital media art design. So a single structure of art teaching

knowledge can no longer meet the requirements of the development of the information industry. The cultivation of design ability requires students to adjust the general traditional design learning thinking mode, increase their understanding of information technology systems, and meet the requirements for the application of basic technical abilities. This not only practices formal aesthetic content in the teaching of design majors, but also expands the practice of related technology in the field of professional technology. Teaching theory and design methods are increasingly closely linked to the forefront of technology.

Therefore, we need to strengthen interdisciplinary research, apply interdisciplinary theories, methods, and achievements such as art and design, informatics, and computer science, and comprehensively measure digital media art teaching based on industrial development capabilities. Based on the principles of information theory, systems theory, and cybernetics, we will select representative design projects in the industry for investigation and analysis, and subdivide production and creative characteristics and process flow research. Enable digital media teaching to have the natural genetic conditions of the information industry, break away from the traditional single knowledge model of design teaching, and cultivate the ability to coordinate multiple professional knowledge systems. By planning the application of information technology, expanding and transforming information technology, we can more support the realization of design creativity. Technology without design and application has no practical value, and design without technical support is also an inefficient activity. The combination of art design teaching and information technology is the key to cultivating high-quality digital media art talents.

5.3 Suggestion

5.3.1 Understanding Touchdesigner's use of Touchdesigner to build perfect visual styles

Touchdesigner, as a type of visual art, has always been a pursuit of cutting-edge and perfect vision by creators. Although this kind of perfection is not fixed, it may vary in different historical periods, cultural backgrounds, and cognitive concepts. In addition to general visual material beautification and lighting effect modification,

more techniques are used to create a visual effect that transcends reality, such as grafting, collage, appropriation, and reconstruction. Although these techniques are not unique to the digital age, advanced digital technology has provided greater convenience and possibilities for these operations. Software and hardware that are becoming increasingly powerful and intelligent, as well as diverse and rich network resources, provide powerful support for image acquisition, grafting, collage, appropriation, deconstruction, and reconstruction techniques. Creators can recreate existing images to achieve their perfect visual effects, thereby achieving visual appeal to the audience and realizing their aesthetic value. It seems that beautiful visual effects are always easy to attract and impress the audience. Creating beautiful images is not only important in static images, but also has a strong attraction in interactive and dynamic images, which is a very important element that touches the audience. In 2019, the Japanese internet celebrity team TeamLab built and exhibited their work "Water Particle World in Oil Tanks, Eliminating the Boundary of the Work" at the Shanghai Oil Tank Art Center. In the vast immersive interactive video scene, giant waterfalls fall from the sky, with countless colorful flowers floating around. The work also reflects the changes of seasons, and the form and color of flowers will change with the seasons.

Negroponte once said: The quality of display is a typical viewing experience that utilizes other sensory experiences. It is indeed not solely related to vision. The overall composition of various senses is indeed greater than the sum of parts. Some experiments have shown that people's understanding and judgment of things tend to be based on a comprehensive sensory experience of multiple senses, rather than a specific sensory experience. The conversion between multiple senses is on the one hand, it is a multi-channel expansion of people's experience and perception, leveraging the characteristics of various perceptions And the advantages, and grasp a fuller object from the perspective of overall perception; On the other hand, it is to create another kind of wonder, that is, the novelty brought about by the mutual transformation of perceptions, which often has greater appeal to the audience. As Dutch cultural theorist and critic Mike Bal pointed out in his article "Visual Essentialism and the Object of Visual Culture", the behavior of "seeing" is fundamentally "impure". This kind of non pure behavior is first and foremost because

"watching" is a biological behavior controlled by human senses. Therefore, social scientist Las Newman conducted an experiment to test the audience's response to display quality. He installed two identical recording devices and screens, A and B, and projected videos of the same image quality. In Group A, he used the ordinary sound quality of the video recorder and the small speakers of the display screen. In Group B, he used high-quality speakers. In the end, a surprising result was achieved, with most experimental subjects believing that the images in Group B were clearer. Through experiments, it can be seen that people tend to make judgments based on comprehensive sensory experiences as a whole, rather than making judgments based on individual senses. The sum of senses is always greater than the simple sum of mechanical and individual elements. The influence of the individual's own factors is subjective, mixed with emotional colors, and is cognitive and rational. In addition, this impure sensation can also be adapted to other sensory sensations, such as hearing, smell, touch, etc., allowing them to penetrate and transform each other. That is to say, senses such as hearing, smell, and touch can have visual intervention, and vision can also have other senses penetrate and transform. Music, as the name suggests, is the art of hearing. Due to its lack of concrete and visually perceptible objects, it is also the most abstract art, and the audience can only rely on pure imaginative thinking to outline colorful scenes in different melodies. The same melody can be endowed with countless images, artistic conception, and stories by audiences with different experiences and aesthetic perceptions. With the changes in communication media and the widespread application of images, music, a purely auditory art form, inevitably has a relationship with visual images, shifting from relying solely on the participation of the ears to an art that can be "seen" with the eyes. In the digital age, the image art supported by digital technology has further enriched the visual expression of music.

In short, the involvement of Touchdesigner images in real space not only provides richer forms of expression and broader creative space, but also enables cross spatial communication and interaction that combines virtual and real space, further expanding the scalability of real space. In such a mixed space, artists can use the latest technological achievements to more effectively express current cultural ideas and emotions, giving their works stronger expressive power. This is first manifested as digital images can bring more impactful visual effects and more infectious visual

experiences to the real space. Secondly, the combination of virtual space and real space has achieved a transition from static to dynamic and interactive states, making the space more open and becoming a more flexible and diverse "living" space. Finally, Touchdesigner images inject a temporal dimension into the real space, breaking through the dimensional limitations of the real space and externalizing the temporal factors internalized in the images, achieving a connection between reality, history, and the future, and deepening the audience's experience.

Firstly, we need to solve the problems in the development of Touchdesigner's digital media art major

In the development process of Touchdesigner digital media, changes in art media and integration based on digital means have led to the formation of Touchdesigner digital media art education in the context of digital technology, art design, and new media research. Therefore, we can say that Touchdesigner's digital media art major is a unique professional discipline formed through the integration of digital media technology and artistic creation. Touchdesigner's digital media art major is an important support for cultivating students' solid computer technology and basic artistic theories. It requires vocational college students to master the current application status, principles, and basic theoretical knowledge and skills in the field of art film and television, as well as network multimedia, through learning courses, and ensure that students can engage in artistic creation and practice in the field of film and television and network multimedia. In this process, vocational college students need to possess not only artistic skills, but also corresponding digital technology application abilities. Students should also possess professional technical skills in Touchdesigner, such as digital art design software applications, interactive art, video design, etc., when learning the art theories and skills related to Touchdesigner digital media art. However, in the actual teaching process, we have found that students with certain artistic abilities lack the ability to learn cultural knowledge, and their understanding, operation, and application of relevant technologies are only limited to the surface. When students think of a good idea in the specific execution process, they will also be unable to express the idea due to insufficient professional technical skills, and the entire work, whether in content or form, cannot meet the design requirements.

Secondly, we need to address the problems in the development of Touchdesigner's digital media technology profession,

In the development and teaching process of Touchdesigner's digital media technology major, it mainly focuses on technical theory and practical operations, supplemented by art teaching. It is an interdisciplinary professional type that integrates technology and art. Students in this major must master the basic technical theories and practical operation methods in the fields of network, information, and art during the learning process. They must possess professional knowledge and skills in digital media production, planning, content transmission, and content processing. At the same time, they also need to possess certain artistic expression abilities. Ensure that students can apply their professional technical abilities and artistic knowledge to solve practical problems. In the specific teaching process, the curriculum of the major places too much emphasis on the cultivation of students' professional technical abilities, placing computer operation technology, multimedia processing technology, digital technology, and network operation technology in the main position of the curriculum. However, various disciplines of the art major are subordinate to the auxiliary position of technical teaching. This teaching mode leads to students' higher professional technical abilities and lower artistic appreciation abilities, The comprehensive quality of students cannot be comprehensively improved. In the process of creating digital media, students tend to have strong skills but lack innovation. In addition, the curriculum of computer operation for students majoring in digital media technology is not as detailed and rigorous as that of majors such as computer science and technology and software engineering, resulting in students' professional artistic cultivation not being comparable to that of art majors, and computer operation skills not being comparable to vocational students majoring in computer science, making it very difficult for such students to enter society for employment.

5.3.2 Analysis of the Approach to Integrating Software and Art in Touchdesigner's Digital Media Specialty

（1）Actively building a comprehensive teaching staff

Touchdesigner Digital Media is a new discipline that requires more professional teachers in the process of curriculum system construction. These teachers

should not only possess comprehensive professional knowledge, but also possess corresponding artistic cultivation. In addition to ensuring that students learn professional digital media knowledge, they can also improve their artistic abilities through the guidance of teachers themselves. Colleges and universities should actively utilize their educational resources and build a teaching team of full-time and part-time teachers. Firstly, in the process of building a full-time teacher team, it is necessary to improve the professional abilities of teachers, and through the guidance of subject leaders, educate and train the digital media professional teachers of our school, so as to form a reasonable knowledge structure for the entire full-time teacher team. At the same time, it is necessary to actively build a comprehensive teaching team and develop young teachers with strong work ability, high work enthusiasm, and high professional quality. We should focus on cultivating young teachers as subject leaders in our teaching, and follow the principles of fairness, impartiality, openness, and efficiency. By introducing high-quality talents from universities, self cultivating schools, and supplementing teachers, we should establish a comprehensive team of digital media professional teachers in universities, ensure the efficient utilization and distribution of teacher resources, and build the digital media profession into a rational talent cultivation system with excellent professional skills and artistic abilities of teachers A major with significant teaching effectiveness. In addition, universities should provide opportunities for further education and learning for their teaching staff, strengthen their extensive cooperation with digital media enterprises, actively guide their professional teachers to engage in training and internships in enterprises, and actively encourage the majority of professional teachers to try teaching reform and do a good job in scientific research; Secondly, in the process of building a part-time teaching team, it is necessary to fully leverage the advantages of the regional digital media industry, and combine the teaching tasks of universities to recruit a large number of part-time teachers from enterprises. On the basis of improving students' learning ability, it can also further expand their thinking ability, improve their practical and creative abilities.

（2）Actively building and improving the teaching system of Touchdesigner digital media courses

Colleges and universities should utilize the school's well-established teaching system and educational resources to organize professional teachers to develop scientific and reasonable talent training plans, providing corresponding theoretical basis for the integration of software and art disciplines and the construction of cross disciplinary scientific teaching systems, in order to actively build the Touchdesigner digital media professional curriculum system. In the process of student education, it is necessary to continuously strengthen the collaborative development of students' professional basic knowledge, application ability, and practical ability, in order to ensure that students can have a comprehensive theoretical knowledge and practical ability in digital media, and ensure that their ideas can be better expressed through computer technology, fully reflecting the teaching concept of integrating art and technology. In short, in the process of constructing the Touchdesigner digital media professional curriculum system, the primary goal is to improve students' learning ability, ensure that students fully grasp basic knowledge, highlight the artistic and technical characteristics of digital media professional courses, scientifically set up major courses, do a good job in computer software teaching and art professional curriculum design, and ensure effective coordination between artistic and technical courses in the professional teaching process. In addition, in order to enhance students' practical ability and creativity, and enable them to better apply the knowledge they have learned to practical work, it is necessary to actively engage in cooperation with digital media enterprises. By allowing students to learn and practice in enterprises, the overall quality of students can be better improved. At the same time, the Touchdesigner digital media professional curriculum system should actively engage in extensive communication and cooperation with other disciplines, apply excellent teaching achievements to professional teaching, and continuously expand students' thinking abilities.

（3）Actively building a digital media professional training base to promote teaching innovation. In the process of cultivating digital media professionals in universities, Touchdesigner should always adhere to the vocational characteristics of vocational education, strictly adhere to the educational philosophy of improving students' employability, employment oriented, and emphasizing both theoretical and practical teaching. Continuously reform teaching models and methods, and break

through the limitations of traditional education, Cultivate students' practical ability and innovative spirit. In the specific teaching process, Touchdesigner's digital media major should focus on the combination of computer software technology and art as its teaching characteristics, continuously optimize teaching practice content, construct a hierarchical practical teaching process, adhere to the principle of combining production and learning education, and actively build a training base that combines technology and art, compulsory courses and elective courses, to build a multi-level practical teaching system. In the process of cultivating digital media professionals, we should adhere to the construction of disciplines based on practical training bases, integrate the educational resources of universities, combine the advantages of regional software enterprises, conduct scientific research through strengthening enterprise cooperation, and strengthen the cultivation of digital media practical talents. In addition, it is necessary to rely on the school's training base to strengthen the construction and cooperation management of digital media and other related disciplines, and cover the practical content of courses in multiple professional fields such as multimedia technology, digital animation, and art design, providing a broader practical space for students majoring in digital media. Through cooperation among various majors, while enhancing the practical ability and theoretical knowledge of the digital media profession, students from other majors can also continuously improve their practical space, innovate their thinking, learn from each other's strengths and weaknesses, and take what they need, greatly strengthening the teaching function of university training bases. This not only plays a certain reform role in the practical teaching of the digital media profession, but also cultivates multi-level Highly skilled digital media professionals ensure that students have higher competitiveness in society.

The communication methods are divided into three basic forms: Touchdesigner digital media perception, representation, and display. According to the design type, they are further divided into virtual reality design, augmented reality design, and artificial intelligence design. They participate in research in these application fields and form the technical guidelines for Touchdesigner digital media art talent cultivation, which is also a key point in the construction of digital media art design. So a single structure of art teaching knowledge can no longer meet the

requirements of the development of the information industry. The cultivation of design ability requires students to adjust the general traditional design learning thinking mode, increase their understanding of information technology systems, and meet the requirements for the application of basic technical abilities. This not only practices formal aesthetic content in the teaching of design majors, but also expands the practice of related technology in the field of professional technology. Teaching theory and design methods are increasingly closely linked to the forefront of technology.

Therefore, we need to strengthen interdisciplinary research, apply interdisciplinary theories, methods, and achievements such as art and design, informatics, and computer science, and comprehensively measure digital media art teaching based on industrial development capabilities. Based on the principles of information theory, systems theory, and cybernetics, we will select representative design projects in the industry for investigation and analysis, and subdivide production and creative characteristics and process flow research. Enable digital media teaching to have the natural genetic conditions of the information industry, break away from the traditional single knowledge model of design teaching, and cultivate the ability to coordinate multiple professional knowledge systems. By planning the application of information technology, expanding and transforming information technology, we can more support the realization of design creativity. Technology without design and application has no practical value, and design without technical support is also an inefficient activity. The combination of art design teaching and information technology is the key to cultivating high-quality digital media art talents.

5.4 Future outlook

Touch Designer digital media art is an art form that utilizes modern technological means. It is not only a combination of digital technology and visual art, but also an important component of cultural life in the digital age. With the development of technology, Touch Designer digital media art has shown various development trends, and the following are some main trends.

Firstly, develop towards intelligence. The rapid development of modern computer technology has enabled Touch Designer to create digital media art using advanced technologies such as artificial intelligence. In the future, Touch Designer digital media art will make more use of artificial intelligence technology to assist artists in achieving more refined and complex creations.

Secondly, Touch Designer's digital media art will focus more on the social media field. Social media has become an indispensable part of people's daily lives and an important field for Touch Designer's digital media artistic creation. In the future, the creation and dissemination of Touch Designer digital media art works will pay more attention to the social media field, which will also drive the development trend of Touch Designer digital media art.

Thirdly, Touch Designer digital media art will be more involved in the field of virtual reality. Virtual reality technology is currently a popular application field in digital media art, which perfectly combines Touch Designer digital media art with the real world. The development of virtual reality technology in the future will provide broader development space for digital media art.

Fourthly, Touch Designer will place greater emphasis on the interactivity of technological means in digital media art. The development of Touch Designer digital technology has provided artists with a broader space for imagination, and in the future, the interactivity of digital media art works will become more diverse and precise. This is conducive to promoting interaction between digital media art and audiences, as well as communication and exchange between artists and the public.

Fifth, Touch Designer will place greater emphasis on cultural diversity and innovation in digital media art. With the continuous acceleration of globalization, Touch Designer digital media art is also constantly developing towards cultural diversity and innovation. In the future, digital media art works will pay more attention to reflecting the characteristics and charm of different cultures, in order to achieve cultural exchange, integration, and innovation.

In summary, the development trend of Touch Designer's digital media art presents diversity, diversity, and foresight, which requires artists to continuously explore and try in practice, utilize current technological means, and explore more artistic aesthetic values. At the same time, the future of Touch Designer's digital

media art also requires continuous inverstment from all sectors to jointly promote the prosperity and innovation of digital art.

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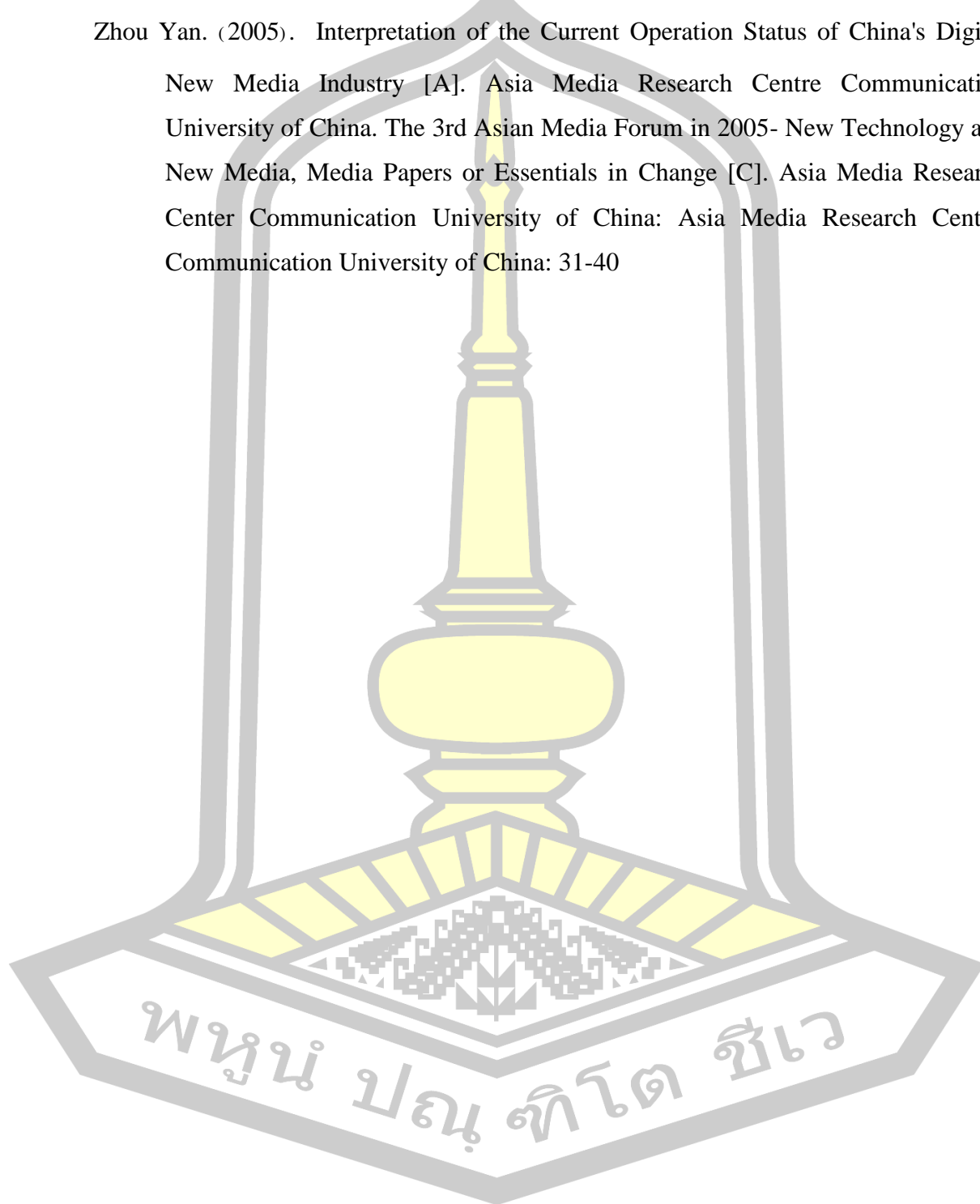
APPENDIX

Appendix 1

Key Informants Interview

City/Town:_____ Date:_____

Name;_____ Age;_____ Gender:_____ Educational

Level:_____

1. How long have you been engaged in digital media art?

2. How do you view Touch Designer artwork?

3. Do you think the current Touch Designer works are forward-looking?

4. Do you rely on software for creating digital media art?

5. What do you think are the pure issues in digital media art works nowadays?

6. How do you view the issue of plagiarism in Touch Designer art works?

7. Can you talk about your future prospects for Touch Designer art works?

8. Do you recommend students to learn how to use Touch Designer for creative

purposes in art teaching?

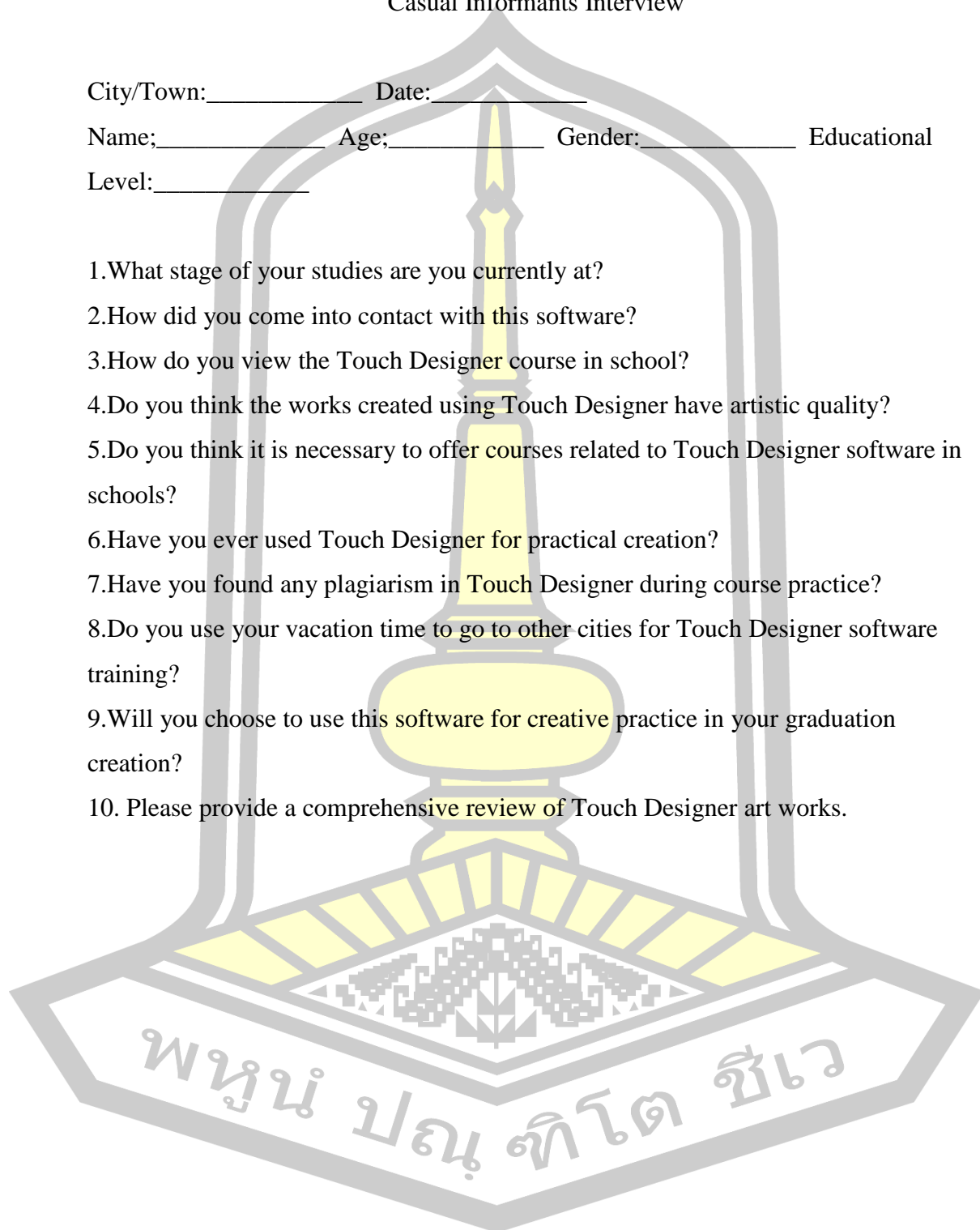9. Please provide a comprehensive review of Touch Designer art works.
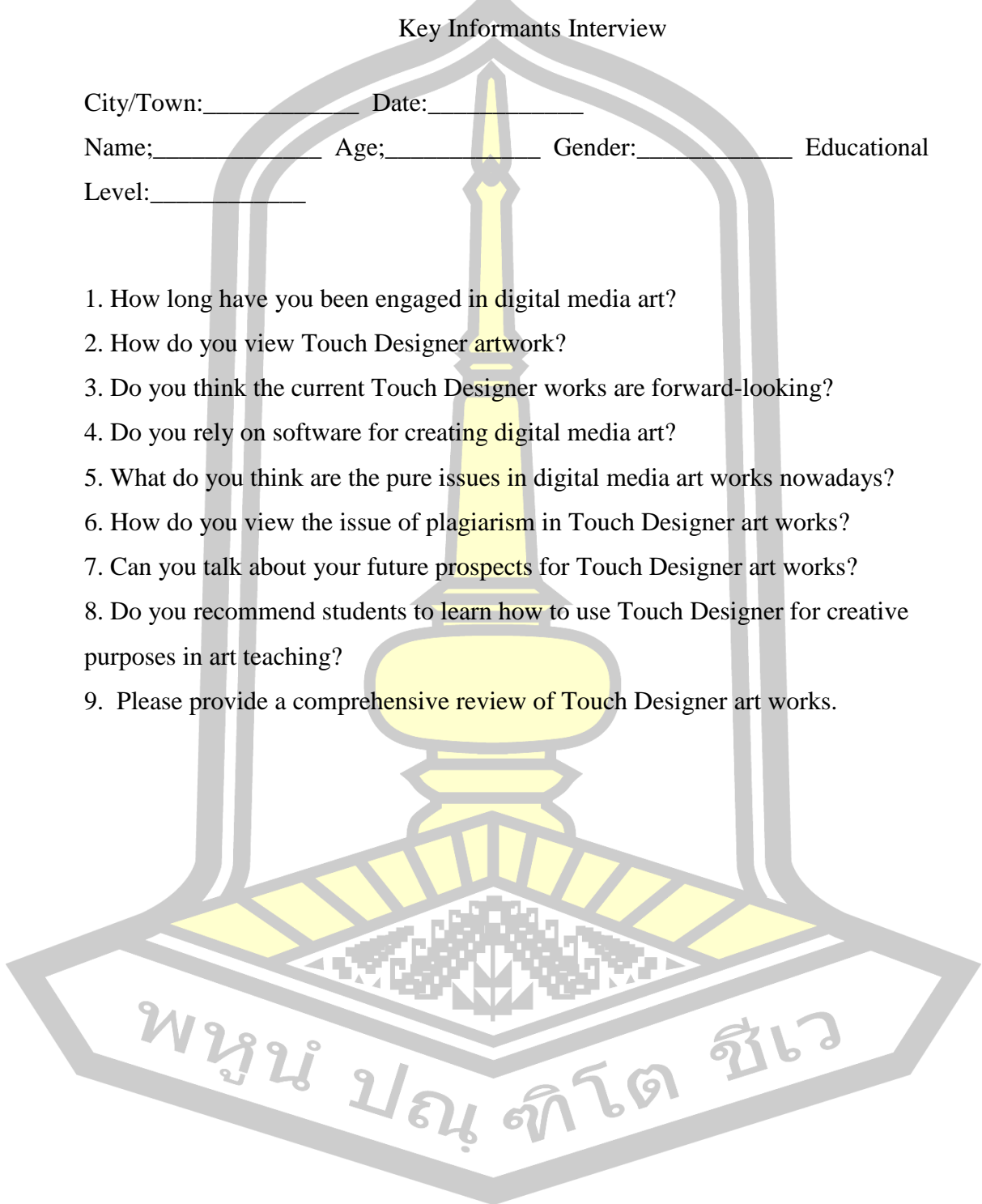
Appendix 2

Casual Informants Interview

City/Town:_____ Date:_____

Name;_____ Age;_____ Gender:_____ Educational

Level:_____

1.What stage of your studies are you currently at?

2.How did you come into contact with this software?

3.How do you view the Touch Designer course in school?

4.Do you think the works created using Touch Designer have artistic quality?

5.Do you think it is necessary to offer courses related to Touch Designer software in

schools?

6.Have you ever used Touch Designer for practical creation?

7.Have you found any plagiarism in Touch Designer during course practice?

8.Do you use your vacation time to go to other cities for Touch Designer software

training?

9.Will you choose to use this software for creative practice in your graduation

creation?

10. Please provide a comprehensive review of Touch Designer art works.
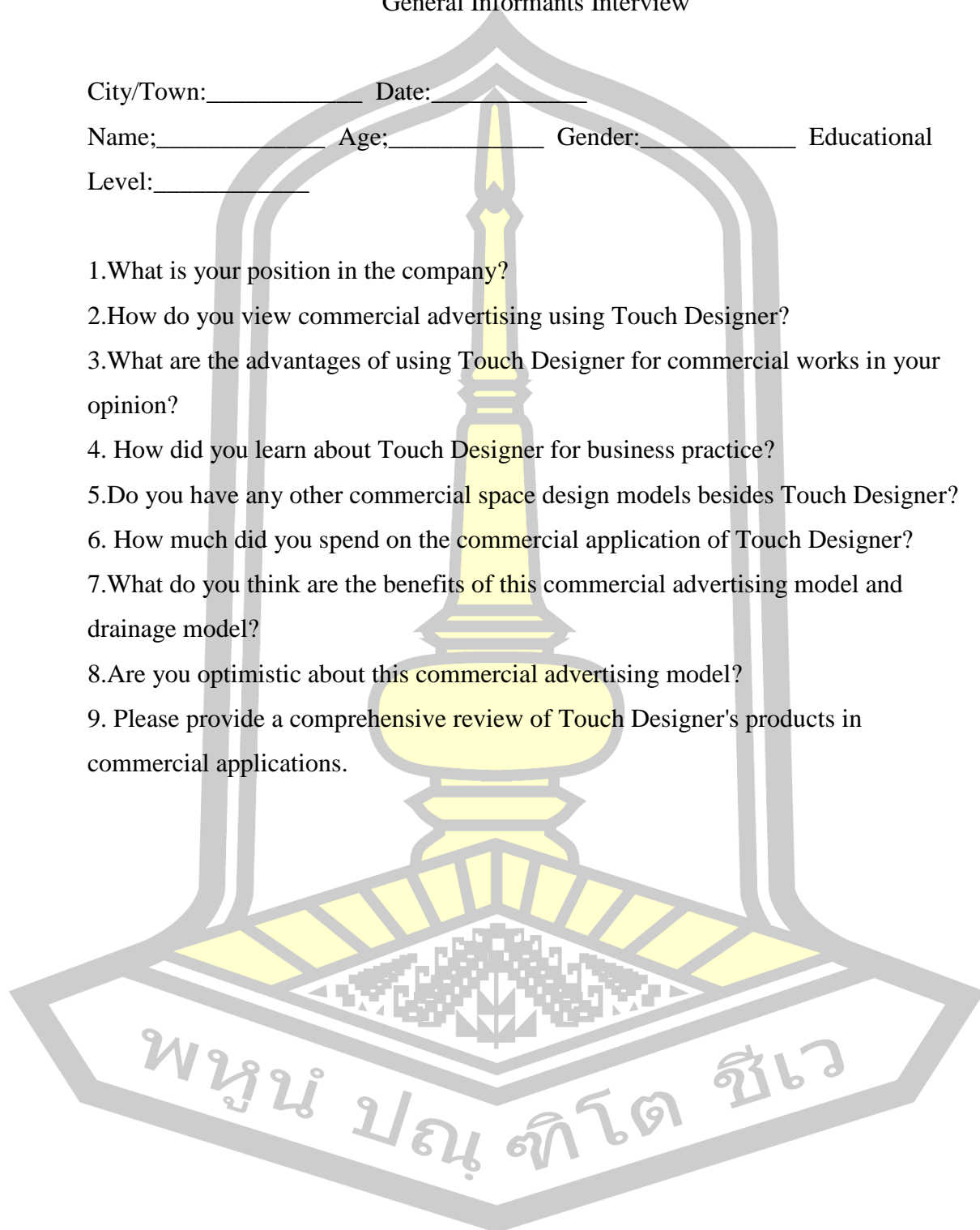
Appendix 3

General Informants Interview

City/Town:_____ Date:_____

Name;_____ Age;_____ Gender:_____ Educational

Level:_____

1.What is your position in the company?

2.How do you view commercial advertising using Touch Designer?

3.What are the advantages of using Touch Designer for commercial works in your

opinion?

4. How did you learn about Touch Designer for business practice?

5.Do you have any other commercial space design models besides Touch Designer?

6. How much did you spend on the commercial application of Touch Designer?

7.What do you think are the benefits of this commercial advertising model and

drainage model?

8.Are you optimistic about this commercial advertising model?

9. Please provide a comprehensive review of Touch Designer's products in

commercial applications.

Appendix 4

List of Interviewees

Zhang Jun, Artistic Director of Digitalfun, Shanghai November 2, 2022

Baixiaomo Artist Software Engineer Shanghai November 5, 2022

Wangchangchun Artist Shanghai November 6, 2022

Caijin Artist Teacher, Chaoyang District, Beijing November 20, 2022

Songxiangdong Professional Artist Daxing District, Beijing November 21, 2022

Fengxinyi Curator, Chaoyang District, Beijing November 21, 2022

Duxinpeng Curator Artist Dongcheng District, Beijing November 22, 2022

Mashibo Teacher Professional Artist Nankai District, Tianjin November 24, 2022

Xushurui Teacher Professional Artist Hebei District, Tianjin November 24, 2022

Dengguoyuan, Dean of Tianjin Academy of Fine Arts, Hebei District, Tianjin, November 24, 2022

Sunyuan Artist, Hebei District, Tianjin, November 25, 2022

Zhangbiao Teacher Artist Hebei District, Tianjin November 25, 2022

Lusiyi New Media Artist Teacher, Jinnan District, Tianjin November 26, 2022

Liupeiwen New Media Artist Teacher, Jinnan District, Tianjin November 26, 2022

Zhaolu Lu Xun Academy of Fine Arts Dean Artist, Heping District, Shenyang City November 27, 2022

Suiguanglong Teacher Artist Dalian Jinpu New Area December 12, 2022

Songguangxin Teacher Artist Dalian Jinpu New Area December 12, 2022

Huanglin Teacher Artist Dalian Jinpu New Area December 12, 2022

Zhangyingchao Teacher Artist Heping District, Shenyang City December 15, 2022

Liuhuaqi Artist, Chaoyang District, Beijing December 15, 2022 (online)

Zhangchao Artist Teacher, Jinpu New District, Dalian December 16, 2022

Zhizhaoliang Student Dalian Jinpu New Area December 16, 2022

Liang Student Dalian Jinpu New Area December 16, 2022

Xuhaoran Student Dalian Jinpu New Area December 19, 2022

Wuxintian Student Dalian Jinpu New Area December 19, 2022

Xuziyi Student Dalian Jinpu New Area December 19, 2022

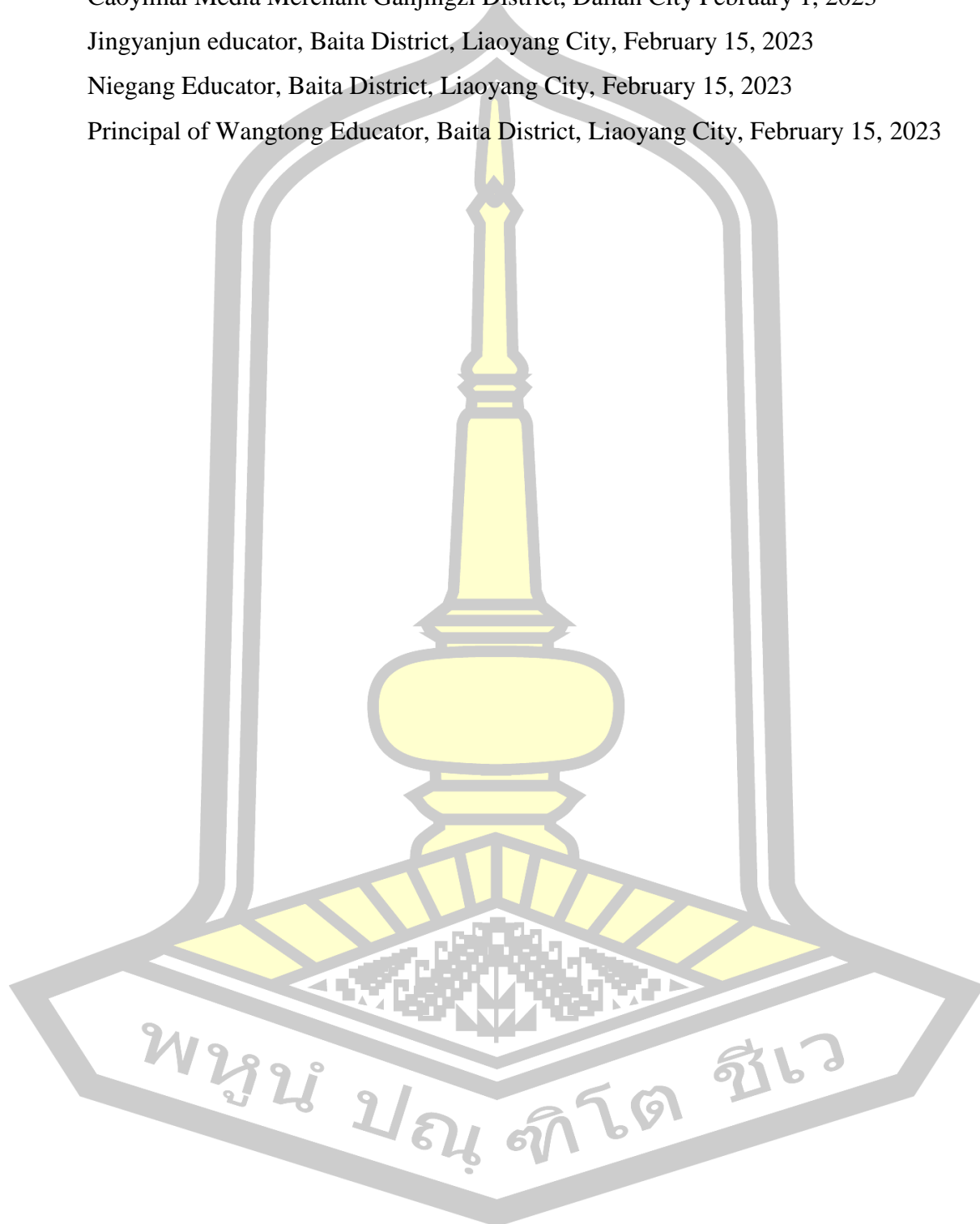Zhangqiuwen Student Dalian Jinpu New Area December 19, 2022

Yinrongliang Advertising Merchant Ganjingzi District, Dalian City February 1, 2023

Caoyimai Media Merchant Ganjingzi District, Dalian City February 1, 2023

Jingyanjun educator, Baita District, Liaoyang City, February 15, 2023

Niegang Educator, Baita District, Liaoyang City, February 15, 2023

Principal of Wangtong Educator, Baita District, Liaoyang City, February 15, 2023

BIOGRAPHY

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