The role of the audience in contemporary data art

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Abstract: As a new form of contemporary art, data art has changed the audience's artistic experience. This paper first introduces the characteristics of data art which are different from other contemporary art. Secondly, in the context of public participation in art, it explores how data art enables audiences to participate in various stages of artistic creation, so that audiences can become one of the creators rather than mere art connoisseurs. Finally, it summarizes participatory issues in different stages of data art.

1. Introduction

With the development of technology in the digital age, data has become an indispensable part of our life. By using “data” as a non-traditional medium, artists change the way we experience art and enrich artistic expression. Audience, as an important part of art display, plays different roles in different stages of art development. In addition, the way audiences participate in data art and the roles they play in data works have also changed, which affects the relationship between audiences and artists as well as the essential attributes of works.

As a new art form, data art has the following problems in art presentation: How to strengthen the interaction between audience and data instead of simple digital visual presentation? How to make audiences participate in data art activities as creators? This paper will specifically review the development process and characteristics of data art, discuss the audience's identity in data art and ways to participate in art through specific cases, and summarize the problems existing in the process of participation. By optimizing these problems, audiences' art participation experience can be improved, which is convenient for artists to optimize the design structure of data art in the later creation process.

2. The source of data art

2.1. Data visualization

Public data-driven art is a recent phenomenon that has been increasing since the last decade, consequently with the rise of data production. Nonetheless, data visualization practice, from which it sprouts out, could be traced back to 6000 years ago [1], according to the father of data visualization Edward Tufte. Data visualization is a technology and method to display data in the form of charts, graphs and maps. Two different approaches could be differentiated for data visualization’s aim: functional and aesthetic. In the first one, data visualization translates a big quantity of data into visual information that allows decision-makers to understand a phenomenon in order to take decisions. It provides accuracy and has to be comprehensible by the viewer [2]. From computer graphics at the end of the 20th century to the wide application of digital technology today, the Department of Information Art and Design established by the School of Fine Arts of Tsinghua University (2005) has opened the curtain of looking at the digital world of human existence with artistic and aesthetic thinking.

With the continuous development and progress of data visualization, the demand for data presentation, effect and other aspects has gradually increased. At the same time, people's demand for data and information is not only rational expression and analysis, but also emotional, cultural and artistic expression. Through the continuous evolution and development of technology, design, application scenarios and data resources, data visualization gradually integrates and surpasses the traditional data analysis and science field, and becomes a new mixed art form and expression—Data art.

2.2. Data Art

Data art is a new form of contemporary art, which is different from Digital art. The former is driven by real data and uses data as the raw material for the creation of works. It combines the technology and ideas of data science and art creation (organically combining data, technology, design and art). Through digital images or integrated material devices and other forms of media, it shows human's exploration and understanding of the world of data. The latter is an art form or art process created using computer image processing, audio and video processing, interactive programming and other technologies. In this process, data is not a necessary element of artistic creation.

Artists have been using electronic devices and computers to create works of art since the 1960s. In recent
years, data art has received more widespread attention and recognition, among which the most famous is the data art work Flight Patterns completed by Aaron Koblin in 2008. Through the data visualization of the flight tracks of 24-hour commercial flights in the United States, it shows the unique visual effects and artistic charm between science and art. Data art, or data visualization, has switched from "a tool in scientific inquiry that necessitated the statistical mapping of data" to a new "hybridized art form" [3].

In 2020, "Immaterial/Re-material: A Brief History of Computer Art" has exhibited at the Ullens Center for Contemporary Art, 798 Art District, Beijing. The exhibition site contains a large number of digital visual art works and some art installations using data as elements.

2.3. Data art feature

1) Data-driven immateriality: Data art has a feature that other art works do not have, that is "data-driven", that is, data is not only the material, but also the content of the work itself [4]. The non-materiality of data art means that the materials used in art works are not traditional material materials, but digital data and information. These data and information are intangible and can only be presented through computer, projection, screen and other technologies. Therefore, data art works usually have the characteristics of virtuality and immaterial. Due to the immateriality of data art works, artists can process and process these digital data and information in different ways to create new art forms and ways of expression. This creative process also needs to be supported by digital technology and tools. We Feel Fine [5] (Figure 1) is a data-art project based on Internet data created by Jonathan Harris and Sep Kamvar. This project collects a large number of people's records and expressions of their emotions and feelings through real-time text mining and emotion analysis of open Internet blogs, social media, news and other contents. These emotional states have immaterial properties that cannot be directly observed.

2) Real-time dynamic generation: The combination of data art and installation is a common way for data artists to create works. Abstract data is attached to the media of art installation, so as to show the constant changes of data. This is because the data art installation is based on the analysis and processing of updated data to form a dynamic visualization effect, so the data generation is real-time and unknown. By acquiring and analyzing data in real time, artists can create works of art with real-time feedback in a short period of time. For example, artist Thijs Biersteker created WITHER x UNESCO [6] (Figure 2), a digital art installation launched in 2021, as a collaboration between the author and UNESCO to raise awareness of the deforestation of the Amazon rainforest. Using real-time deforestation data from the Amazon Monitoring organization, the leaves controlling one square meter of digital rainforest become transparent before your eyes. Each flicker of a leaf represents a loss of 128 square meters of rainforest. This work is a living memorial to the ongoing loss of the precious rainforest.

Figure 2 WITHER x UNESCO, Thijs, Biersteker.

In general, by visualizing and art-making data, artists combine non-emotional data with social events and mass activities, and through static and dynamic combination and real-time generation, give these digital information a deeper meaning and social value, so that the audience can better understand and perceive the things reflected in the data.

3. The relationship of participation in contemporary art creation

In the 1990s, French curator and critic Nicolas Bourriaud first proposed the concept of "relational aesthetics"[7] of artistic participation. Emphasis is placed on the interaction, openness and participation between the work and the audience in contemporary art, as well as the exchange and association of the work, rather than the form or value of the work itself. It has inspired many artists and critics to re-examine the relationship between the work and the audience and explore new art forms and aesthetic models. The concept of relational aesthetics has also been applied to many fields of contemporary art, such as network art and installation art, where artists and critics have been deeply influenced by Bourriaud.

3.1. The two-way creation trend of audience and artist

In contemporary art, audience participation and interaction have become crucial. In addition to creating independent works of art, artists are more inclined to create open and participatory works to promote audience participation and interaction. The meaning and value of such works is established through interaction and
communication with the audience, not just through the look of the work itself or the message it conveys. Participatory art originated in the early 20th century and describes an art form that enables the audience to directly participate in the creation process. It is also a method of creating art. The audience can directly participate in the creation process and become the common publisher and disseminator of works. Cooperation between the two may have an unclear beginning or an uncertain end [8].

The audience has begun to value the artistic idea and is no longer entirely blinded by the technology and novel interfaces presented. On the other hand, artists are less attracted to interactivity and more concerned about the content and artistic concept, which are also indicators of the maturity of the domain [9]. The participatory evolution can better reflect the characteristics of modern art. In the interactive stage, the audience is usually only given the role of participation, while in the participatory stage, the audience can become the creators and co-owners of artistic works, and their influence and decision-making rights on artistic works are more equal.

3.2. Variability of works of art

Variability here refers to the change within the same work itself, which comes from the audience. In contemporary participatory art, the intervention of the audience leads to the change of the essence of the work. In 1992, Thai artist Rirkrit Tiravanija's work "Thai Restaurant" included "many people" as materials in the introduction of the work. In this work, the artist makes Thai food for the audience, and the audience can eat in it for free. By providing food, the work turns the audience into participants. Their behavior and participation change the nature of the work and break the boundary between the audience and the artist.

3.3. The construction of exhibition space

In relational aesthetics, the task of the artist is to create a place to interact with the audience, rather than simply making objects. The audience participates and creates the meaning of the work of art through their own experiences and feelings. The audience is no longer a passive receiver, but a participant in the artwork, a co-creator.

Contemporary art is no longer a simple painting, nor a simple sculpture. It's about the relationship between environment and space. Works of art no longer exist alone, but are connected to their surroundings. Therefore, the audience's experience of the works of art is also closely related to the environment and space. Artists need to design and create an environment and framework that leads to audience participation, but they are not the only creators. The interaction between artist and audience is a process of mutual influence and collaborative creation.

Thus, in relational aesthetics, the work is no longer seen as a separate entity, but is closely linked to the interaction and relationship between the audience and the artist. This concept challenges the traditional concept of art, emphasizes the connection between art and society, and believes that art is an act that can provide value and meaning for society.

4. The audience in data art

Supported by data visualization technology, the practice of data art enhances the transmission of information and the way the public creates and participates in artworks, and further stimulates the audience's emotional and cognitive perception.

In the stage of Data art 1.0, Artistic visual presentation of data, audiences play the role of viewing. It is a data art driven by the production data of 31 kinds of shoes or slippers in the United States from 1960 to 1998 (Figure 3) [10]. After performing accurate three-dimensional artistic visualizations of the data, Salavon shows us the beauty of the data observed from different perspectives. Visual efficiency does not play a role in artistic visualization, quite the contrary. The goal is not to enable the user to read the data, but to understand the basic concern [11].

![Figure 3](image-url)  
**Figure 3** Shoes, Domestic Production, Jason Salavon

In the stage of Data art 2.0 (Figure 4), In the Pulse Room [12], a tower of inverted conical light bulbs hangs down from a height of about a dozen meters. The viewer stands under the lamp and holds a pair of handles. The interactive system feeds his pulse parameters to the system, and the nearest bulb starts flashing a few seconds after receiving the data. Then the circuit of the entire "lighthouse" closes for a few seconds and the signal passes to the next light bulb, all of which are switched on in succession, uniformly matching the participant's pulse rate. "Interaction" here refers to the interaction between people and works of art. In contemporary art, "interactive installation" refers to the new media installation works of human-computer interaction based on emerging technologies such as digital information technology and Internet technology with the help of computer and programming technology [13].
In the stage of Data Art 3.0, for data installation works based on public data collection, the audience may passively participate in information collection and become a part of the presentation of art installation. This kind of audience participation greatly increases the uncertainty and contingency of the work, rather than the stylized interaction of Stage 2.0 (Figure 5). The installation, The Rhythm of City [14], consists of 10 modified metronomes whose performance scores are constructed by collecting the geolocation activity of users of several social networks (Twitter, Flickr, YouTube, Instagram, Foursquare) in real time. The more active a network user is online, the faster the metronome oscillates. In The Rhythm of City, audiences participate in the data collection at the early stage of the work, and their behavior and performance interfere with the presentation effect of the work in real time to some extent.

5. Summary of participatory issues in data art

Based on the above discussion on the role played by audiences in data art, the existing phenomena and problems in the presentation of data art works are analyzed. In the Phase 1.0, in the artistic visual presentation of data, audiences play the role of observers more, with a weak sense of participation. In the Phase 2.0, interactive data art based on digital technology. The audience followed the edited procedure, and their involvement didn't really change the work itself. Besides, the interaction between the audience and the works only exists at the exhibition site. In the Phase 3.0, the audience actively or passively participates in the data collection process in the early stage of the work and becomes one of the creators of the data work. This kind of audience participation integrates intervention, contingency and creation, and uses data to reflect certain behaviors of groups in specific situations, so as to guide audiences to think about their own behaviors. To sum up, at present, the audience's experience of data art is more reflected in the exhibition of works and procedural interaction. How to make the audience's participation in art not only stay in the exhibition stage, but also participate in the early, middle and later stages of the creation of works? How to make data art participatory art, not just stylized interaction? And will the issue of audience privacy and data security be involved in the data collection of Phase 3.0? How to enhance the audience's on-site participation experience? These are all questions worth exploring further.

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References


