# Aids and Reflections on Artificial Intelligence for Public Space Design

Peng Xiao[(✉)]

Nanning University, Nanning, China
403457440@qq.com

**Abstract.** This paper aims to investigate the intricate relationship between intelligence and public art by exploring the evolution of public art within the context of emerging technologies and the multifaceted discussions they generate. Specifically, it delves into the transformative potential of superimposed public spaces and the creation of art within these new spatial dimensions. Additionally, the study examines the integration of digital public art within the realm of art and artificial intelligence, highlighting its capacity to enhance efficiency and fulfill functional requirements. Furthermore, the paper contemplates the future of public spaces, envisioning a smarter and more delightful urban environment where digital public art assumes a central role. It considers how the fusion of art, technology, and artificial intelligence can contribute to the realization of this vision. Ultimately, the study aims to shed light on the pivotal role of public art in the future development of smart cities. Through a comprehensive analysis, this research will provide insights into the dynamic interplay between intelligence, technology, and public art, ultimately offering perspectives on harnessing the potential of digital public art to create more vibrant and intelligent urban spaces.

**Keywords:** Public Art · Urban Public Space · Intelligent · Digital

## 1 Current Status of Digital Public Art

Driven by science, technology and socio-economics, art and design have long played an important role in economic development [1]. Public art, on the other hand, is designed in traditional art forms, such as sculpture and landscape, experimenting with various materials and enriching the expression of forms [2]. With the advent of a new era, advances in digital technology have led to the development of related industries and fields. With the gradual increase in the application of new technologies, the forms of public art have become more interactive and the materials more diverse, with the application of sound and light becoming a direction for technological realization. Digital applications also require visual and graphic integration in the evolving city. The coexistence of art and technology has become an inevitable trend in the development of public space art. After World War II, the rapid and necessary demand for urban space led to a series of social problems, and public space was introduced as a sociological and political-philosophical concept, which in turn drew the attention of the design and art communities. In the 20th

century, digital public space was mainly embodied as an abstract spatial experience, which was perceived and experienced through screens [3]. However, in the era of digital cities, technologies such as virtual reality and artificial intelligence have made the physical experience of digital public space increasingly real, even difficult to distinguish between the real and the fake. In the digital city scenario, connectivity is no longer an option, but a necessity for the public. That is, in a hybrid public space, publicness is not enough; people need to be connected to the space, otherwise it will be difficult to participate in public activities. The web of data will envelop the whole city and even penetrate every public space and different life scenarios. In this sense, it is hard to find data silos in the digital city, where everyone living here will be actively or passively engaged [4]. In the digital city scenario, without access to mobile payment or without opening some personal data, people cannot enjoy some public services of the digital city, so their digital life will also enter a new stage, who will be more willing to connect themselves with the digital society built in the public space of the city, and it will be more and more difficult to be separated [5].

## 2   Artistic Change - from Artificial Intelligence to Public Art

In recent years, breakthroughs in Artificial Intelligence technology have sent people into a frenzy again, as if they have been given the key to unlocking the intelligence that will give machines "life" and "intelligence" soon. While optimists and pessimists continue to argue, artificial intelligence has crept into our urban lives. Artificial intelligence-based devices such as virtual reality devices, augmented reality tools and mixed reality products are creating public spaces that seamlessly integrate real and virtual spaces. The collection of these technologies will be the basic elements of this virtual reality public space where emotion and narrative are the key elements. Art becomes a new "reality" mixed with technology, things in the virtual space are given narrative, and people as creators inject emotion into it, forming a huge digital city that is both virtual and real. In this public space, the digital representation of each person will be extracted by sensors everywhere, and people will exist as digital people in the digital urban public space represented by art such as the metaverse. At the same time, fed by this data, artificial intelligence is growing rapidly in the game of self. In today's computer deep learning can fake my own video and unparalleled restoration of the voice. In the future it will replace us in the digital world of immortality. The soul is already "connected", and the body should not lag. In the pursuit of escape from Earth, perfection and immortality, the flesh will continue to be mechanically digitized. With the development of brain-computer interface, the human consciousness will be connected to everything and space through the Internet of Things. Under the influence of both capital and power, virtual reality, augmented reality, the Internet of Things and artificial intelligence may build a new order in the name of digital cities and future communities, and designers and artists, as the mappers and builders of this huge project, need to be constantly reminded of their ultimate mission: to provide a vision of the future direction of human development. As a result, contemporary art that appeals to the public or authorities is more likely to become permanent public art, and this compromise tends to undermine the experimental and critical nature of contemporary art.

# 3    Digital City - Spatial Characteristics of Digital Public Art

Due to the development of mobile Internet, the public nature of urban public space is declining, and the business and social models of traditional public space are undergoing dramatic changes. Public spaces constructed with traditional ways of thinking have less and less influence on contemporary interpersonal interactions in cities, and new media have reshaped the structure of social interactions. In the era of smart cities, shared spaces efficiently managed with intelligent systems will improve the declining publicness of public spaces and reinvigorate public life and stimulate the vitality of urban public spaces. In digital urban public space, many traditional private and public spaces will be transformed into interactive spaces, which are difficult to judge by traditional public and private spaces, but through precise management, the same spaces will be divided into private and public moments in the time dimension, and the streets of the future will be characterized by interaction. This virtual city is a digital representation of the real-life physical city in a computer network. It is enough to liberate the urban public space from the physical scale, where the vast universe exists in a drop. The thousands of worlds live in a microcosm and the people use public space can have a more imaginative living experience in the virtual city. The emergence of virtual cities not only responds positively to the needs of urban citizens, but also saves physical resources and environmental protection. Public artists combine virtual space with real space to create more pleasant artworks and give aesthetic value, achieving a flexible transition between the physical and the real. The flexible transition represents the mapping of the real world landscape in the virtual digital world This purpoes of using the real space instead is to enable the virtual cities the real feeling including touch, smell, etc.

# 4    Digital Everything - the Social Value of Digital Public Art

An important part of cultural revitalization and cultural innovation is the use of urban public space, which requires public art to design and create the cultural history, development history and urban memory contained behind the city. Therefore urban public art requires artists to combine the image of the city with traditional cultural heritage and historical deposits to form an ideal urban public space.

# 5    Insights and Recommendations

AI has the potential to revolutionize public space design, offering innovative solutions and transforming the way urban environments are planned and developed. This paragraph introduces the topic of AI for public space design and highlights its potential for creating more efficient and user-friendly urban spaces.

## 5.1    Data Analysis and Urban Planning

AI-powered data analysis plays a crucial role in public space design. This paragraph discusses how AI algorithms can process vast amounts of data, including demographics,

traffic patterns, and environmental factors, to gain insights and inform urban planning decisions. By analyzing this data, AI can identify areas in need of improvement, optimize resource allocation, and help create urban spaces that are tailored to the needs and preferences of the community.

## 5.2 User Experience and Human-Centric Design

AI can contribute to human-centric design principles by understanding and responding to the needs and behaviors of people using public spaces. This paragraph explores how AI algorithms can analyze user behavior, gather feedback, and make recommendations for optimizing the design of public spaces. By considering factors such as accessibility, safety, and aesthetics, AI can enhance the user experience and ensure that public spaces are inclusive, inviting, and well-utilized.

## 5.3 Simulation and Visualization

AI-based simulations and visualizations offer valuable tools for public space design. This paragraph explains how AI algorithms can generate virtual models that simulate different design options and scenarios, allowing urban planners and designers to visualize the potential outcomes before implementation. These simulations can help evaluate the impact of design choices, test different configurations, and engage stakeholders in the decision-making process, ultimately leading to more informed and effective design solutions.

## 5.4 Adaptive and Responsive Environments

AI enables the creation of adaptive and responsive public spaces that can adapt to changing conditions and user needs. This paragraph explores the potential of AI-powered systems, such as smart lighting, intelligent signage, and responsive infrastructure, to dynamically adjust to environmental factors, traffic patterns, and user demands. By leveraging AI, public spaces can become more efficient, sustainable, and adaptable, ensuring a seamless experience for users and optimizing resource utilization.

## 6  Future Work

Combining some of the suggestions and ideas provided in the previous section to help designers better design public spaces:

1. Determine the purpose and needs of public space design: Before starting the design, the designer needs to understand the needs and purposes of the client to determine the direction and focus of the design.
2. Consider the characteristics and limitations of the site: The designer needs to consider the characteristics and limitations of the site such as topography, climate, vegetation, etc., in order to use and deal with these factors appropriately in the design.

3. Create unique public space features: Designers can create unique landscape features by selecting appropriate plants, materials and construction methods to make the design more attractive and personalized.
4. Consider sustainability and environmental protection: In the design, designers need to consider sustainability and environmental protection and choose appropriate plants and materials to reduce the impact on the environment.
5. Use technical means to assist design: designers can use modern technical means, such as 3D modeling and virtual reality, to assist design and display effects in order to better communicate and collaborate with clients.

In conclusion, public space is a complex process that requires designers to consider a variety of factors in order to create a satisfactory design solution. China's public space design industry has grown rapidly over the past few decades, especially in the midst of urbanization. More and more cities and public spaces require landscape architects to provide aesthetic and functional solutions. At the same time, landscape design is also increasingly focused on ecology and environmental protection as concerns about environmental protection and sustainable development continue to grow.

However, the public space design industry in China is also facing some challenges. On the one hand, the market is highly competitive and some design firms may neglect design quality and innovation in order to reduce costs and improve efficiency. On the other hand, some landscape design projects may be used by the government or developers for bragging rights and publicity, while neglecting the actual use and maintenance needs.

Overall, China's public space design industry has a broad development prospect, but it needs designers to continuously improve their quality and innovation, as well as the support and guidance of the government and the market to achieve sustainable development and maximize social benefits.

## 7   Conclusions

The creation and development of the virtual city have led to a clearer demand from the public for their own participation and interaction. At this point, artists and designers should not be limited to what is visible. Instead, most of these works are related to interactivity, and the basic presentation relies on new media displays that allow the public to engage in a dialogue with the works as they explore the data behind the surface. To a large extent, public art in virtual space is a space for the public to gain a greater sense of participation and interaction, so that group identity can be reflected in each individual. The need for a sense of participation and identity is not only found in social media, but also in podcasts, online games, web programs, and other types of virtual spaces. When public art participates in virtual spaces, it perfectly integrates the need for public participation and the need for identity in terms of interactivity. Between the two, a pattern of mutual composition has been formed that fits each other, and the search for new forms of public art has been the topic of the current era. Technologies such as artificial intelligence and metaverse are making cities smarter and will expand more application scenarios for digital cities. While we are excited to embrace digital cities and welcome the arrival of AI cities, we must remain rational enough. There is no good or evil in technology. In the face of an intelligent future that is both friend and foe, artists need

to grasp the core of technology. It is improved from within at the source, and integrate it into digital public art that is both functional and humanistic. It may be an important means of ensuring that technology is used appropriately, so it will certainly become an extremely important art form that will influence future urban life. Practitioners of art and design will also need to actively and rationally use new technologies to spread the seeds of inspiration to new and unprecedented continents, demonstrating the possibilities of the future of humanity.

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