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Research Article

Artistic Digital Display and Analysis of Interactive Media Wireless Sensor Clusters

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For video art, the coupling of digital technology and postmodernist thinking has brought not only technical progress and formal transformation but also a new mode of thinking and way of living around visual experience and even a change in the whole world view. The digitalization of the image not only lies in the change of the surface form, but also it has evolved into a supermedium, connecting the real world and the virtual world, becoming a new way and means for us to grasp the world, which can be considered a huge transformation. However, while digitalization has brought great development to video art, it has also confused many issues that need to be further explored, especially the inevitable transformation in creation. This paper takes digital video art as the main object of study and explores the crisis of representation and the problem of transformation that has arisen in it, with reference to "technology," "form," "concept," and even "social and cultural life." We also analyze, summarize, and conclude the transformation of video art and its creation rules in the digital context and propose corresponding creation strategies, taking "technology," "form," "concept," and even "social and cultural life" as the starting point. For the detection of a small area, a star structure can be used to achieve a flexible arrangement of each sensor while satisfying the real-time performance. For the collection of information in a large monitoring area, if a star structure is used, the nodes are overloaded with low reliability and low utilization of communication lines. The wireless data acquisition system uses the relatively scalable UCB telosb hardware platform, while the hardware platform uses an operating system with good portability, which can give full play to the hardware performance of the platform and effectively reduce the power consumption of the system. Based on the current art trend, this paper discusses the transformation of video art in the digital background from the perspective of "technology" and "concept" and proposes corresponding creation strategies to provide theoretical to practical support for digital video art creation practice and bring some inspiration to creators. It will also bring some inspiration to the creators. Cluster analysis is used to effectively improve the introduced algorithm, and the simulation results show that the improved algorithm can reasonably plan each sensor node in the region while reducing the number of sensors, so that the effectiveness of each sensor node can be well utilized.

1. Introduction

Nowadays, we are in the period when the "information age" is gradually moving towards the "intelligent age," digital technology is advancing rapidly, the popularity of Internet and mobile network has completely changed people's work and life style, while the development of artificial intelligence technology is once again impacting on people's production and life [1]. It can be said that we are in an era of drastic changes in both material culture and ideology [2]. At the same time, with the shift from modern art to contemporary art, art has become more diversified and decentered and is increasingly related to people's daily lives [3]. For video art, the intervention of digital technology and even artificial intelligence technology has brought unprecedented opportunities for its creation and dissemination, not only making the language of creation, expression, and existence of video more rich and varied but also making its dissemination more extensive and fast [4]. More importantly, as the basic information and medium of the information age, images have penetrated into every aspect of work and life and are the new media art form that is most closely connected with

people's daily life and enjoyable to watch [5]. Nowadays, digital images or digital video artworks are everywhere in our lives, such as WeChat, Weibo, online shopping, and online games in the virtual world and various exhibitions and public spaces in real space. Even the traditional paper media, movies, and television have become the carriers of digital images and digital video art [6].

The development of digital technology and network technology has transformed images from traditional analog images based on physical and chemical properties to digital virtual images based on digital information, and in the process of gradually entering the age of intelligence, both image creation and images themselves have become increasingly intelligent. This has greatly reduced the learning cost and the threshold of image production, making it possible for not only professionals but also the general public to participate in the creation of images, and thus, the subject and object of creation have changed drastically [7]. For example, portable digital devices such as mobile phones can be used to take photos anytime and anywhere and then use APP software such as Meituxiu and Snapseed to do postprocessing and rely on new media platforms such as WeChat, Weibo, Facebook, Twitter, and Instagram to spread and communicate with the images. It has evolved into a social means. Obviously, the digitalization of images brings not only technical progress and changes in form but also changes in people's concept of images, which is a fundamental transformation of images [8]. In such a context, while the times have brought new developments in video art, they have also led to a number of issues to be explored, especially in the area of creation, which is also facing an inevitable transformation. The reason is that against the background of the rise of postmodernism and the support of powerful digital technology, the creation of images has gradually been freed from the constraints of technique and experience and has become more about the deeper subjective consciousness, while the new digital media, especially the Internet, has brought a broader living space for images, so the traditional concept of images has gradually disintegrated [9]. However, in reality, many creators fail to realize the fundamental transformation of the image in the digital context or fail to keep up with this change, and thus, due to insufficient understanding, they still cling to their old ideas and old-fashioned expression language, making their works uninspired and lacking in modernity. Moreover, the development of digital video art is also hindered by the relative lag of relevant theories and evaluation standards. This can be seen in some large-scale photography and video art exhibitions that have the significance of wind vane. The dominant exhibits or final award-winning works are often still those that conform to traditional concepts or aesthetic tendencies, while those works with exploratory, innovative, and contemporary spirit are not valued or even marginalized. In addition, because of the prominent technical characteristics of digital images, there is a serious disconnection between theoretical research and practice—those who do technical work are only concerned with the form, while those who do theoretical work are not familiar with the technology or have little understanding of it, thus making the theory too abstract and lacking guidance value in practice [10]. Therefore, it is necessary to discuss the transformation and creation of video art in the digital background from the perspective of integrating the two levels of "technology" and "concept." In other words, from the perspective of creation, we should take "technology," "form," "concept," and even "social and cultural life" as the starting point to discuss the transformation and creation of video art in the digital context. From the perspective of creation, we analyze and study the transformation of video art in the digital background; sort out, summarize, and conclude the corresponding forms of creative expression, language of expression and the law of creation; and propose fruitful strategies [11].

Its integrated sensing technology, embedded operating system computing technology, modern network communication and wireless network communication technology, distributed multi-information processing technology, etc. can monitor, sense, and collect all kinds of art information or monitor information about multiple objects in real time through a variety of integrated microsensors working together, and these multidimensional information is transmitted wirelessly and connected in a self-organized and multihop network transmitted to the user's terminal. In this paper, the points with large curvature on the isotherm of temperature and humidity gradient field and the points with dense isotherm are selected as the key location points, and the sensor nodes are arranged by optimizing the key location points so as to obtain various kinds of data in a targeted manner. The software simulation of the optimal sensor node allocation scheme and the analysis of the simulation results show that the selected optimal sensor arrangement strategy can reasonably plan each sensor node in the region, which makes good use of the effectiveness of each sensor node. With the intervention of digital technology in imaging, traditional images are gradually transformed into digital images, which inevitably bring unique forms of expression. This paper then defines digital imaging into three stages based on the development history of digital technology: the stand-alone era, the network era, and the artificial intelligence era, and then composes and discusses the expression forms and technical characteristics of digital imaging in each stage according to this definition and summarizes the basic characteristics of digital imaging art.

2. Related Work

With the rapid development of modern science and technology, people's demand for all kinds of information has made great progress in information acquisition technology, and now information acquisition has been taken as an important direction in information science [12]. The main research object of information acquisition technology is the acquisition, storage, and transmission of information data and processing, etc., while combining sensor network technology, information processing and transmission technology, computer technology, and other technologies forms the basis of modern detection technology. In recent years, the information acquisition technology related to data acquisition has been developed rapidly, and the application of digital data acquisition systems has become more and more widespread.

Compared with analog systems, digital systems can digitize abstract analog signals and analyze the analog quantity through signal processing techniques, which has the advantages of high accuracy and reliability [13]. On the other hand, there are more and more data acquisition system methods. In the case of small information collection, we can use 8-bit low-cost microcontroller system to collect information and process data; in the case of massive information, we can use relatively high-cost high-speed embedded FPGA system to collect information and process data; when the data acquisition system requires data collection of multiple information, we can use a flexible implementation based on CAN or PCI bus way to achieve flexible multichannel multi-information data acquisition [14]. At the same time, when it is inconvenient to use the wired acquisition method under some complex arts or to realize the fast and seamless connection of the whole data acquisition system, the wireless data acquisition system based on wireless sensor network technology can be used. Wireless sensor network is the current international attention, involving multidisciplinary intersection and knowledge integration of the frontier hot research field [15]. Its integrated sensing technology, embedded operating system computing technology, modern network communication and wireless network communication technology, distributed multi-information processing technology, etc. can monitor, sense, and collect all kinds of art information or monitor the relevant information of many kinds of objects in real time through the cooperation of many kinds of integrated microsensors, and this multidimensional information is transmitted wirelessly and in a self-organized and multihop network connection [16]. This multidimensional information is transmitted wirelessly and delivered to the user's terminal in a self-organizing and multihop network connection, thus interconnecting the physical and computational worlds as well as the triadic world with human society.

The first generation of sensor networks appeared in the 1970s, subject to the current state of science and technology development and wireless sensor networks in the information acquisition nodes using traditional sensors; data transmission mode is only point-to-point transmission mode, with simple information acquisition capabilities, so only point coverage; the second generation of sensor networks was compared to the first generation, in terms of information acquisition capabilities and data transmission [17]. The second generation of sensor networks, compared to the first generation, in terms of information acquisition capabilities and data transmission has made great strides; this generation of sensors has a more comprehensive ability to collect various types of information for analysis and data interface using serial/parallel interface mode, while using RS232 and RS485 and other bus protocols and sensing controller communication, in improving the speed of information transmission while increasing the stability of data transmission, in the late 1990s and the 21st century. In the late 1990s and early 2000s, with the rapid development of the Internet and the widespread use of fieldbus technology, the third generation of wireless sensing network emerged, and the sensor network in this period showed intelligent characteristics; in terms of sensor nodes, each data collection node has the ability to intelligently obtain a variety of information. In terms of data transmission, the field bus method is used to communicate with each other and the main controller in the network, while using Internet technology to constitute a local area network, thus constituting a wireless sensor network system with intelligent features; at present, wireless sensor network technology has become increasingly mature, the research and development of network data transmission protocols have been towards application; the emergence of the Internet of Things makes the sensor network move towards the fourth generation [18]. By integrating different types of sensors in the node, it can obtain various information around the clock without interruption and then analyze and process the obtained information and send the results to the network through wireless self-organization, thus constituting an intelligent wireless sensing network. The research and application of wireless sensor network have shown diversified characteristics [19].

By building a hardware platform for wireless sensor networks and the art of software development, an end-to-end system is designed that supports multiple types of sensor interfaces with ultralow power consumption characteristics and its battery life is claimed to last up to about three years. Also, in order to achieve barrier-free communication and communication, full duplex communication between any two nodes in the sensor network ensures controllability while ensuring network reliability. In addition, the system is compatible with network protocol standards such as IEEE802.15.4 and Zigbee, providing a wide choice of connection methods, including LonWorks, BACnet, Ethernet, and standard serial I/O ports. In the civil application area of sensor networks, a typical application of sensor networks that is said to be well known is the ZebraNet project, which was proposed and implemented by the Department of Electrical Engineering at Princeton University to study the habits of wild animals and protect them [20]. The project revolutionized the way wild zebras were observed by using a sensing network in conjunction with a GPS (global positioning system) to observe their habits in real time and dynamically. On the other hand, Crossbow Technologies was the first company to offer a commercial wireless sensing network. Their latest generation product is equipped with a microprocessor, memory, storage, and an internal A/D converter, all integrated into a device one-quarter the size of the original. The company's sensor nodes are designed to detect magnetic force, acceleration, light, temperature and humidity, and other physical quantities [21]. To date, research on wireless sensor networks can be broadly summarized by academics worldwide into two typical phases: the first phase focuses on optimizing the hardware configuration of sensor nodes using microelectronics technology to design more miniaturized and intelligent sensor node devices, with representative research projects such as Smart Dust; the second phase can be considered to be the first phase from sensing. The second phase can be considered to start from the attention and research of sensing network technology and corresponding communication protocols, and this phase is currently becoming a hot spot in the research field of wireless sensing networks.

3. Design of Information Collection Systems for Digital Art

3.1. Customization of Information Collection Nodes. The model takes into account the building energy consumption, human comfort, and artistic health, and the energy consumption and human comfort are closely related to the indoor temperature, humidity, and air pressure, as shown in Figure 1. This directly affects the energy consumption calculation of the building, so the selection of sensors needs to take into account the accuracy and stability, while considering the convenience and speed of the sensor arrangement. The temperature data acquisition unit needs to carry different numbers of temperature sensors on a single node, and the requirements for the sensors are easy and fast deployment, and the fewer the wires between the nodes, the better and preferably a single bus to communicate with the nodes (single bus, i.e., only one defined signal line; each device hooked up to the bus can drive it at the appropriate time, but each device on the bus must be an open drain or tristate output). The DS18B20's single bus ports (I/O pins) are open drain, and its unique single bus technology can be easily arranged anywhere in the building. A multipoint bus consists of a single bus and multiple slaves hooked to it. The single-wire bus requires a pull-up resistor of approximately 5 KΩ. Each device on the bus has a unique 64-bit serial number in the photolithographic ROM, which is factory-engraved and can be regarded as the address serial code of that DS18B20, thus enabling the purpose of hooking up multiple DS18B20s on one bus to meet the platform's sensor requirements.

In terms of artistic healthiness, it mainly comes from pollutants in indoor air art. At present, the uneven quality of building materials in the domestic building material market makes some unqualified building materials, interior decoration materials, and artificial furniture's also enter people's living art in large quantities; these unqualified products are not processed by professional harmful substances, making its volatile emission of various harmful gases seriously endanger people's health, while these poor-quality building materials (such as flooring) contained within the harmful substances through close contact with people are likely to lead to people's poisoning, etc. On the other hand, with the common application of air conditioning system, most of the urban buildings are airtight, while the requirement of airtightness of doors and windows in building energy-saving design, which will lead to the harmful pollutants emitted from interior decoration materials, cannot be diffused, all of which seriously affect the health condition of human beings, as shown in Figure 2.

According to incomplete statistics, there are more than 300 types of indoor air pollutants. Some of the more common pollutants are volatile organic compound pollution, microbial pollution, and chemical reactant pollution. The pollutants can have a serious impact on indoor air art and greatly endanger human health. They can produce greater harm to the human body's upper respiratory system, the body's cardiovascular system, and the central nervous system of the brain, and in serious cases, some will even cause

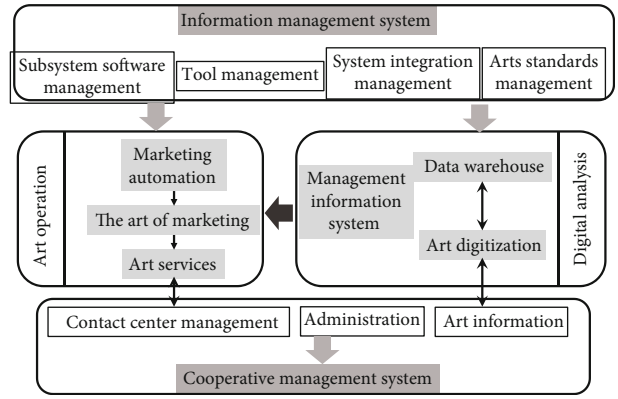

Figure 1: Information collection system components.

cancer; volatile organic compounds are also the main cause of sick building syndrome (SBS). Therefore, the main focus here is to detect and collect data on the main airborne pollutants that affect human health. It integrates various types of sensors, data acquisition and processing units, data communication units, etc. The nodes form a distributed network by means of relevant protocols, and then, the relevant data collected is optimized, and then, the optimized data is transmitted to the information processing center of the data processing unit by means of radio waves. Due to the large number of nodes in the sensing network and the fact that the initial position of each node is randomly deployed, while the nodes are in an environment that may change at any time, this determines that the sensing network has characteristics that are not available in ordinary sensor networks.

3.2. Sensor Topology Selection. The information acquisition system needs to carry different numbers and classes of sensors on each sensor node to achieve temperature acquisition on the internal surfaces of the building by deploying these sensors at different places in the building (including the walls). This requires the sensors on the nodes to be easily developed and flexibly arranged for the acquisition of various information from the building units. So the choice of the topology of the sensors on the nodes directly affects the subsequent processing of the data, and the results obtained with different topologies can vary. Therefore, the bus-type topology with simple and flexible structure and high reliability and which is very easy to expand is more suitable. On the other hand, the bus-type layout is easier to install and ideal for broadcast type work and has fast network response time. While achieving overall detection of the area, a bus tree-type topology can be used for more complex areas, thus enabling easy and fast collection of all types of data. The sensor node topology types are shown in Figure 3.

3.3. Optimal Arrangement of Sensor Nodes. The model multidimensional information data is obtained using the idea of multiview surface measurement and key location point measurement, which is needed to obtain the key location point information in the space. Simulation and analysis of the multidimensional information in the building unit in the SEEE model show that the temperature and humidity

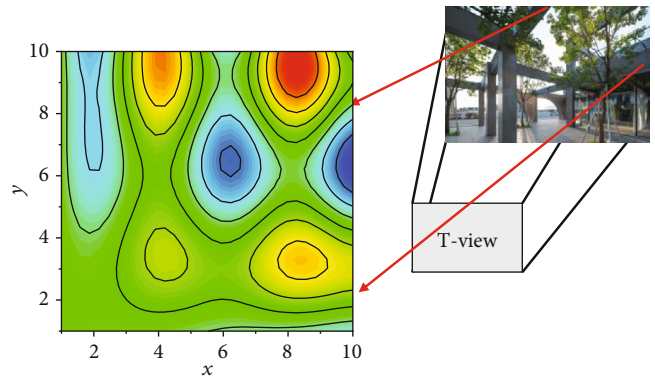

Figure 2: Stability performance curves.

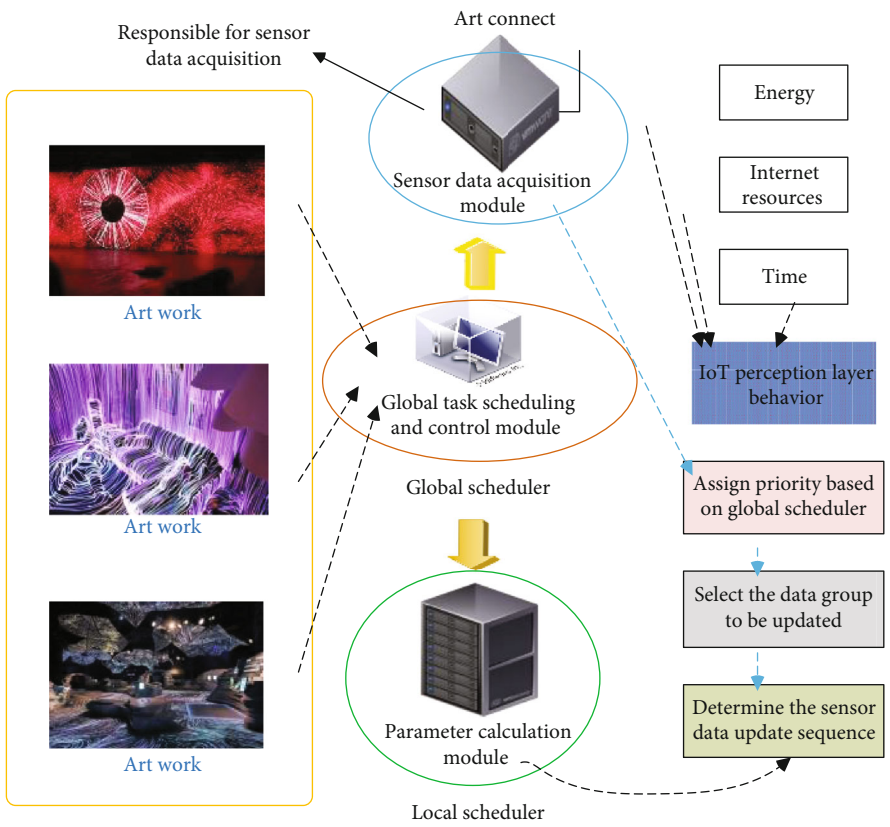

Figure 3: Types of information collection nodes.

distribution in the indoor space and the surface of the envelope structure show certain regularity, which helps us to obtain where the key locations in the space are, so that the corresponding sensor nodes can be arranged in a targeted manner. The sensing network is mainly composed of three parts, which are data acquisition network, data distribution network, and network control management center. It integrates various types of sensors, data acquisition and processing units, data communication units, etc. The nodes form a distributed network by means of relevant protocols, and then, the relevant data collected is optimized, and then, the optimized data is transmitted to the information processing center of the data processing unit by means of radio waves. Due to the large number of nodes in the sensing network and the fact that the initial position of each node is randomly deployed, while the nodes are in an environment that may change at any time, this determines that the sensing network has characteristics that are not available in ordinary sensor networks. First, there is the property of no central point and self-organizing network. In the sensing network, all sensing nodes are equal in status, there is no predesignated center point, and each node is coordinated with each other through a distributed algorithm, so that the nodes can self-organize into a measurement network under unattended conditions. It is also because there is no central point that the measurement network is not compromised by the

disconnection of a node. Secondly, there is the nonstatically changing nature of the sensing network topology. Because the nodes in the sensing network are in an environment that may change at any time, the state of these nodes is also changing to varying degrees, coupled with the instability of the wireless communication channel itself, so the network topology is constantly changing to adapt to the needs of the environment, but these changes cannot be accurately predicted in the way. Third is the limited characteristics of the sensor's ability to transmit data. The data transmission of wireless sensor network through wireless network technology eliminates the trouble of network wiring, but for the wired network, its inherent defect is low bandwidth; at the same time, there is also interference between the signal and the signal, which makes the signal strength in the process of transmission constantly decay. However, it is also because the amount of data to be transmitted by a single node is not too much, so the attenuation of signal strength is not too significant and is within the tolerable range. Fourth, the sensing network is characterized by energy limitations. Due to the need to measure the specific values of each parameter in the actual environment, each sensing node will be densely arranged in the area to be monitored, so it is not logical to perform the energy replenishment manually. Therefore, each node requires sufficient energy reserves for its long-term operation, and the sensors themselves draw solar energy from the outside through solar panels on the nodes. Fifth, the security of the sensing network is not reliably guaranteed. In most data collection environments, due to the susceptibility of the wireless channel to interference, there is limited energy of the collection nodes; in addition, the distributed deployment and control of each node make each data collection node vulnerable to attack; see the attack methods such as passive eavesdropping, implantable intrusion, and denial of service; once the wireless sensor network is attacked, the consequences are unpredictable. Therefore, the issue of security of the sensing network is crucial in the design of the network.

4. Digital Presentation of Interactive Media

The idea of optimal assignment of critical location points is to optimally combine critical location points and then assign these optimized combinations to sensors so that the sensors detect as many critical location points as possible, with the ultimate goal of achieving the minimum sensor arrangement, i.e., the optimal sensor assignment problem. From the characteristics of wireless sensor networks, we know that the transmission capacity and energy of wireless sensor nodes are limited, so in the process of arranging, sensors need to fully consider the performance characteristics of each sensor node for deployment; here, we assume that all sensor nodes are isotropic; i.e., their composition of the sensing network is homogeneous and at the same time each sensor node after the successful arrangement, to meet the coverage and connectivity requirements. The flow pattern of air in a room shows turbulent characteristics as shown in Figure 4, so there are two arrangement options to obtain accurate information of temperature, humidity, and wind

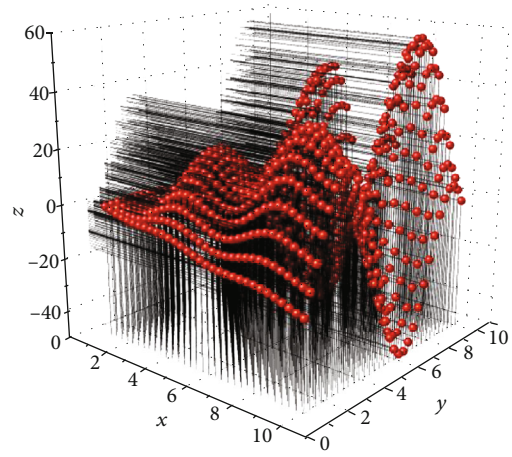

Figure 4: Cross-sectional gradient distribution.

speed in a room: (1) uniformly distributed measurement and (2) multiview surface measurement and key location point measurement.

The analysis of comfort as well as environmental health in the room has little impact and is a little more complex compared to the first scheme. In this paper, the second scheme is used to achieve overall room information collection; i.e., the data collection nodes are arranged by simulating and analyzing the flow characteristics in the room and selecting the key location points. The key means the most critical part of the thing, the factor that plays a decisive role in the situation. Through the simulation analysis of multidimensional information field, we can accurately grasp the temperature and humidity field distribution of each location point in the room; then, the next step is to select the key location points, where we select the global temperature lowest point, the global temperature highest point, and the point with large temperature change as the key location points that have a greater impact on human comfort. At the same time, in order to better reflect the overall information distribution in the room, the point with a larger slope change on the isotherm of the room temperature and humidity gradient field can be selected as the key point. Its gradient distribution is shown in Figure 5, and we analyze the selection of key points, where a key point corresponds to a sensor detection point.

Some critical locations are relatively close to each other, so the critical location points can be optimally allocated so that a sensor can monitor multiple critical location point information. The optimal sensor assignment is more similar to the original classical art gallery problem, polygon, and art gallery valued problem as shown in Figure 6. The classical gallery problem is described, i.e., for a polygon P (art gallery), find a minimal set G of points belonging to P such that every point in P is visible as viewed from some point in G. In general, a planar polygon is defined as follows.

For the vertices of a polygon in the plane, there is a set of vectors with at least three points v_1, v_2, and v_3; then, the sides of the polygon $E = \{v_1, v_2, v_3, \cdots, v_n\}$. Also, the polygon has discontinuous nonintersecting edges. A simple polygon is a Jordan curve and thus can be divided into three subsets:

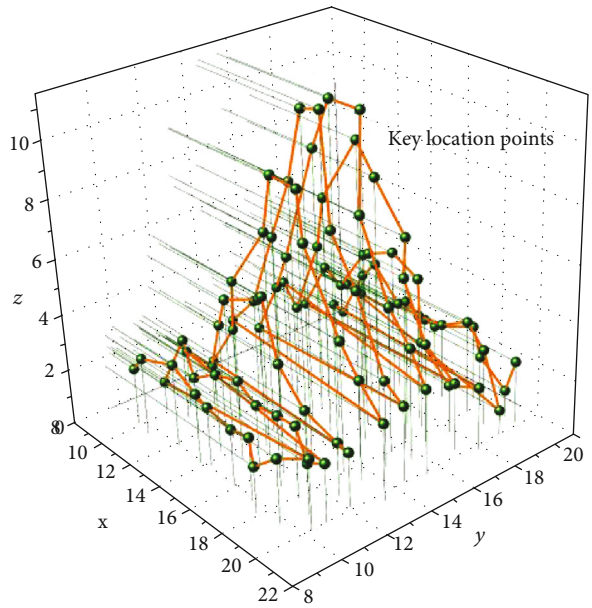

Figure 5: Distribution of key location points.

the polygon itself, the interior of the polygon (including the boundary), and the exterior of the polygon (except the boundary).

In human cognition and experience, the most basic brain circuitry is actually the mere response mechanism, i.e., analyzing the environment and reacting to it. In the behavioral stage, essentially, it also works in a nonconscious situation, where it is the external environment that prompts the audience or participant to respond or act accordingly to the environment. Thus, the work, at this stage, is about guiding the audience through the elements, causing them to produce or adopt the appropriate behavior. At this level, we also need to base on visuals and combine other elements to guide the audience or participant to operate, so that they can have a richer and more intuitive experience; at the same time, we make use of the flexibility of digital images to give corresponding feedback to the audience or participant's operation, so as to trigger their deeper reflection and further operation. At this stage, our focus in creation is on "guidance" and "interaction." For a long time after the invention of photography, due to the underdevelopment of transportation and communication, most people had a limited range of activities and limited access to information and content. As a result, there were photos reflecting the strange scenery and customs of remote areas, which were quite popular at that time, and later on, those images reflecting marginalized people or environments that were not easily accessible to ordinary people, such as insane asylums and drug addict groups, were also very popular. This on the one hand satisfied the curiosity of people at that time and on the other hand also aroused some kind of concern or expanded people's horizons. Therefore, a spectacle can be said to be the innate media property and expression of images. Especially in the digital era, the intervention of digital technology has given digital images more possibilities and flexibility in achieving visual effects of spectacle, allowing the imagination to run wilder and create more colorful and astounding visual experiences of spectacle.

For a set G to contain a set P, it is sufficient for any set $\{G_1, G_2, \cdots, G_p\}$ to contain P. For the sensor network optimal allocation problem, the set G is the location of the sensor arrangement and the set P corresponds to the detected region, and the goal is to find the smallest set of sensors to fully cover the detected region, where n is the sensitive points in the detected region. However, unlike the art gallery problem, there exists a sensing radius for each sensor, and then, the probability of each sensitive point being detected decreases dramatically as the distance between sensors increases. This problem is subsequently shown to remain an NP-hard problem. From the art gallery problem, we can see that for a given region, as long as the coordinate positions of the sensitive points in the region are known, then a certain algorithm can be used to achieve the optimal arrangement of sensors to some extent, using the detection radius of the sensors as a constraint, as shown in Figure 7. As a kind of visual art, the creator of image art has always wished to pursue a kind of visual perfection. Although this perfection is not set in stone, it will vary in different historical periods and different cultural backgrounds and perceptions. In addition to the usual visual embellishment of materials and modification of light and shadow effects, more techniques such as grafting, collage, appropriation, and reconstruction are employed to create a visual effect that transcends reality. These techniques are not unique to the digital age, but in the digital age, advanced digital technology has provided greater convenience and possibilities for these operations. Increasingly powerful and intelligent hardware and software, as well as diverse and abundant network resources, provide powerful support for image acquisition, grafting, collage, appropriation, deconstruction, and reconstruction. Creators can recreate existing images to achieve their perfect visual effects, thus completing the visual appeal to the audience and realizing their aesthetic value.

For the same detection area, the variation of the number of key points has a great impact on the algorithm; we choose the number of key points from 10, 20, 30 to 100 increasing; the simulation results of the comparative analysis are shown in Figure 8, lk-lal is the longest rectangular edge dichotomy; QT is the least sensor optimization arrangement algorithm. The perception stage, when the digital image work is perceived and felt by the audience, is when visual perception is mainly at play. By analyzing the current situation of existing information acquisition systems, studying the development of technologies of wired and wireless sensor networks, and combining the data requirements of the SEEE model, a low-cost, low-power wireless data acquisition system is constructed to realize the acquisition and wireless transmission of art information data in the SEEE model. This requires us to create visual effects that are visually attractive enough to achieve the audience's attention and participation in the work, and to complete the connection and integration with the work. In the past, video art as a visual art mainly realized visual effects through visual elements such as points, lines, surfaces, bodies, colors, light and shadows, and textures. In the era of new media, the

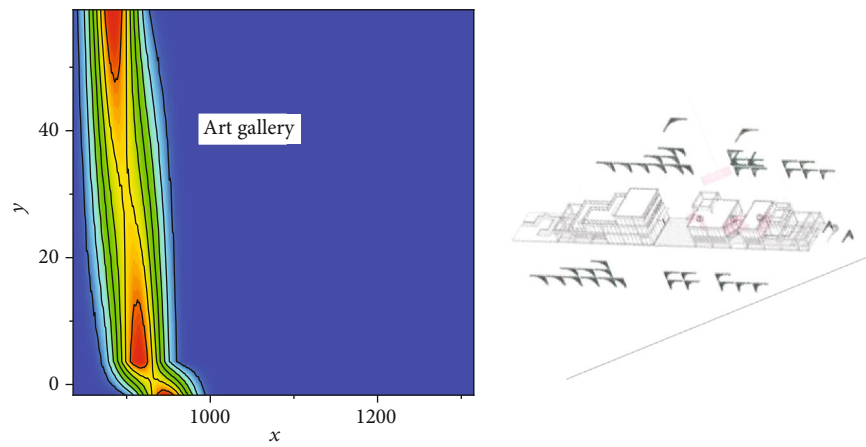

Figure 6: Polygons and the art gallery manning.

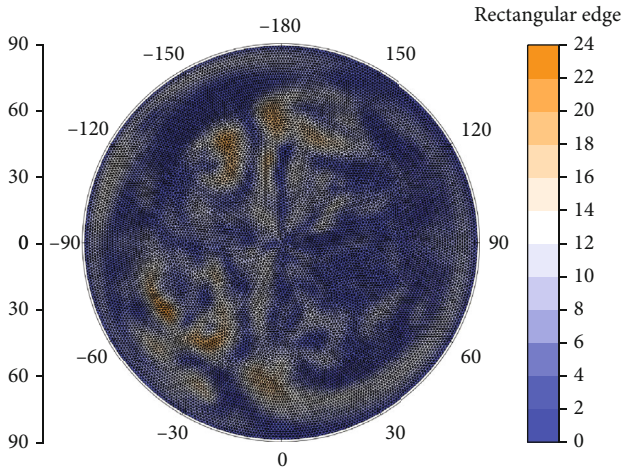

Figure 7: Longest rectangular edge dichotomy.

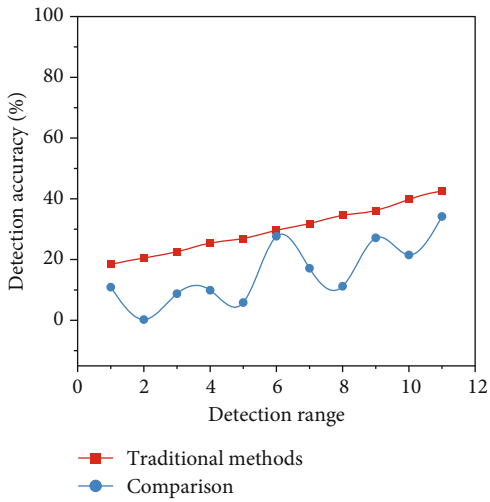

Figure 8: Detection accuracy at the same detection range.

characteristics of digital image itself make it more open and malleable, so that it is no longer limited to visual elements, and the characteristics of digitalization, virtualization, and media make it smoothly transformed in connection with other senses or media and have more possibilities in form. It can be based on visuals, make full use of digital technology, and combine with other media or art forms to realize multichannel and multisensory experiences, creating unique and novel visual effects, which can be perceived by audiences.

In this era of rapid development of digital technology, new technologies and forms are emerging and iterating rapidly, information is overwhelming, and ideas are active and stirring. This gives artists more new forms of expression and a broader space for expression and inevitably leads us to think about art in a new way. Digital technology is the basis for the existence and development of digital video art, and it has brought enormous creative space for digital video art expression and even completely changed the creative thinking. From its initial rise to prosperity, digital imaging has continuously adopted new technologies and absorbed new ideas at various stages, showing vibrant forms of expression. At this time, digital technology cannot simply be regarded as a means of expression but is completely integrated with art, becoming the external form and connotation of the artistry of the work, as well as the aesthetic object of the work.

The emergence of new media does not mean that the old media are worthless or completely extinct; the old media, with their own characteristics, will still exist and develop in certain spheres and have great attraction as well. There is usually a competitive relationship between the old and new media, but it is not an either/or relationship, and cooperation and healthy interaction are also possible. Whether it is "new wine in old bottles" or "old wine in new bottles," the integration of old and new media is not simply a matter of putting them together, but of drawing on each other's advantages and strengths and bringing them into full play, so as to maximize the complementary advantages and achieve the effect of "1 + 1" is greater than "2." In particular, human beings as a whole are a species that likes the new but is not averse to the old and full of curiosity and expectations

for new things but also attached to the familiar things of the past. Therefore, the kind of things that can perfectly combine the old and the new is more approachable and more acceptable to people. This is also in line with the spirit of inheritance and development that people often talk about. On the one hand, the old media can borrow the ways, methods, or platforms of the new media to inject new vitality into them and give them new life in the digital age; on the other hand, the new media can borrow and use the experience, content, and forms of the old media to provide more space and opportunities for their own development. Especially in the context of contemporary art, it is increasingly common to adopt integrated materials for creation. It is now increasingly common to create video works through new media and digital technology, but people are not satisfied that the works exist only in the virtual space constructed by digital technology but hope to transform the virtual "soft" images into touchable "hard" works through some special methods, so as to realize unique works, "soft" images into touchable "hard" works, thus achieving unique artistic effects.

5. Conclusion

For the multiview surface measurement and key location point measurement ideas in the art digital model, the temperature and humidity changes in the building unit are simulated and analyzed through CFD technology to grasp the distribution of various types of information in the building unit, so as to obtain various types of data in a targeted manner. Through the simulation results, the key detection point information in the building unit is obtained, detection location information for each type of sensor arrangement is provided, and at the same time, the introduction of the minimum sensor optimization arrangement algorithm optimizes the arrangement of the sensor nodes, so as to more accurately and effectively acquire various types of data. In addition, cluster analysis is used to effectively improve the introduced algorithm, and the simulation results show that the improved algorithm can reasonably plan each sensor node in the region while reducing the number of sensors, so that the effectiveness of each sensor node can be well utilized. However, the information collection system constructed in this paper only considers a limited space and can operate stably in a building environment that is not very complex. However, the actual situation is relatively complex, especially in the industrial environment, how to ensure stable and effective data acquisition and transmission, which is still an unknown; all the subsequent work still has a lot to do. Meanwhile, in terms of the optimal arrangement of sensor nodes, only the detection environment is considered to be the steady-state information field, i.e., the temperature and humidity field distribution obtained when the air conditioning system is in a steady-state situation, and then, the sensors are arranged and optimized. In this case, the distribution of the information field in the building space when the air conditioner is in unsteady operation is not considered, so further research work is on the dynamic arrangement of sensor nodes, which is still being further explored. In the future, make full use of digital technology and combine with other media or art forms to realize multichannel and multisensory experiences, creating unique and novel visual effects, which can be perceived by audiences.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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