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Retraction

Retracted: Deconstruction of Urban Public Space Art Design Using Intelligent Sensor and Information Fusion

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] H. Meng and Y. Sun, "Deconstruction of Urban Public Space Art Design Using Intelligent Sensor and Information Fusion," *Journal of Sensors*, vol. 2022, Article ID 9360982, 9 pages, 2022.

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Research Article

Deconstruction of Urban Public Space Art Design Using Intelligent Sensor and Information Fusion

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The main purpose of smart city is to improve the quality of life, improve the efficiency of life, and save the energy resources of life, which is in line with the current global concept of low-carbon environmental protection, energy saving and emission reduction, and ecological sustainable development. Under the process of smart city, the development of urban public space is also committed to meeting the material and spiritual needs of residents' lives. For the system hardware design, the street lamp node, and the concentrator node hardware design, the sensing node is composed of multiple sensors. Its main components are temperature sensor, infrared sensor, sound sensor, and light intensity sensor, which, respectively, realize the collection of temperature, infrared, sound, and light intensity information. The street light sensing system uses multisensor information fusion technology to detect the situation of people and vehicles in real time, so that people and vehicles can turn on the street lights and turn off the street lights of unmanned vehicles. Adjust the street light switch according to the intelligent analysis of the lighting demand scene in order to enhance the accuracy of the system to identify the lighting demand scene. This enables the system to provide safe lighting conditions for urban traffic while saving the power consumption of urban lighting. The sensor system of the street light randomly selects the detection results of temperature and humidity within a certain period of time. The error rate of the final test result is 1/2 of that of the traditional test, and the accuracy is far lower than that of the traditional measurement method. Regarding the lighting system of street lamps and public art in urban public spaces, it is worthy of extensive promotion to control street lamp lighting through sensor information fusion technology and reduce energy consumption.

1. Introduction

In the process of the Friendship Exhibition of public art, the functions and concepts of public art under the background of the development concept of the times, the social environment, and the human environment factors are different and constantly changing. Contemporary public art research mainly has two artistic levels: one is the visual plastic art as the research object, another is to take functional public facilities as the research object, and they all form an interdisciplinary, multidimensional, and multiperspective blending relationship. The new form of public art presented by means of technology shows the characteristics of technical complexity and design integration, realizes the technologicalization of urban public art, promotes the process of urban digital development, and solves the problem of urban environmental development. The intelligent design of public art refers to the important role played by modern science and technology in the design, creation, operation, and use of public art.

Under the process of modernization, public art is constantly producing new art forms, the way of interacting with the public and the city is increasingly updated, and its own value orientation is constantly being added with new definitions. People's feelings for one another, for art, and for the city are all enhanced by the interplay of urban space. The astute provision of public art made with cognitive researchers and advanced technologies demonstrates living thing knowledge from using renewable power and the defense of the natural ecosystem, and to some degree,

understands the mystical theory of artists and dwellers to help shield this same urban environment is necessary ecosystems. Taking the intelligent art design of urban street lamps as the object, through the intelligent change of urban street lamps, the city can spread the temperature and warm every corner of the city through this street lamp.

Inductive public art refers to works of art that change the physical state of people's voice, movement, natural airflow, temperature, humidity, etc., which can trigger the original form of public art, discuss the basic types of intelligent design in public art from the perspective of intelligence, and realize the practice of humanization and human culture in urban public space from the perspectives of technological factors and sensor information fusion technology. The update and practical application of science and technology plays a key role in the intelligent design of public art. It can be said that science and technology promote the development of intelligent design of public art, and intelligent design of public art is based on science and technology.

2. Related Work

Humanities are an important concept in the construction of contemporary smart cities, and public art is the medium to reflect the unique spiritual outlook of smart cities. Yin et al. selected Nanjing Jiangbei New District Industrial Technology Research and Innovation Park as the research object based on the humanistic shaping of the smart industrial zone and discussed the effective way of its public art planning from the connotation, planning function, and planning method of public art [1]. Cayer and Bender combined participatory observations of art activists, semistructured and oral history interviews with homeless people in Tokyo, and historical analysis [2]. Crte-Real reported on a piece of public art on the limits of painting, illustrating contemporary research questions based on painting as an element or essential part of installations, public art, urban interventions, performances, nontraditional media, and materials [3]. Darivemula et al. sent the white coat to the national conference for presentation, revealing the challenges, resilience, and humanity of women's medical training to work, the ways in which women's medicine is empowered through public art [4]. While these are all about the study of public art, the scope of the study is too broad.

Currently, there are many challenges in various fields that researchers are trying to solve with sensors. Focusing on the specific application scenarios of on-board gas sensors, Yang reviewed the working principle, research progress, and application status of on-board sensors at home and abroad. The study concluded that on-board gas sensors played a huge role in power system monitoring and vehicle environment monitoring [5]. Chahine et al. combined random watershed segmentation, which provided multiple segmentation results, with the Hessian operator to obtain unique and efficient segmentations [6]. Yaghoubi et al. developed a new multiclassifier fusion method for statistical analysis of different noise levels by using Dempster-Shafer theory to measure and mitigate conflict between evidence [7]. Herrera-Quintero et al. designed an ITS (Intelligent Transportation System) smart sensor prototype using a serverless and microservice architecture integrating and combined with an Internet of Things (IoT) approach to aid in a transit planning (BRT) system for bus rapid transit [8]. Chuang et al. designed a thermoelectric power generation device with a simple structure, and the designed device is expected to increase the power generation capacity without using additional energy to cool the thermoelectric power generation chip [9].

In order to keep the signal processing circuit small, low cost, simple, and robust, Morais et al. used a novel direct interface sensor-to-microcontroller circuit technique for capacitance measurement, and it was allowed to measure small capacitance deviations without a high frequency oscillator [10]. Most of these studies are about the analysis of data, and there is too little research about smart sensors in public art.

3. Public Art of Smart Sensors and Information Fusion

3.1. Application of Sensors in Smart Street Lights. A sensor is a device that detects changes in surrounding information and can convert the changes of scanned information into electronic signals or other required information output methods according to the rules of information transmission [11]. The sensory functions commonly used in today's smart public facilities are mainly realized by the sensing devices of the components, which are the main part of the automatic detection and automatic control implementation of smart public equipment. The existence of sensors enables intelligent public art design to have touch, hearing, smell, and other senses and gradually makes public art more intelligent [12]. The sensing technology based on the sensing intelligent public art is a multidisciplinary modern science and engineering technology about obtaining information from natural sources, processing, and identifying it.

With the introduction of the concept of smart city development, the development needs of modern cities are diversified. As cities grow, urban construction also needs to be sustainable and consistent with the development of urban diversification and the sharing economy. The research and development of sustainable energy applications and intelligent data processing have become a hot spot [13]. The public art needs of modern urban society have developed from pure aesthetic art to interactive experience and information exchange. Intelligent design has begun to be applied to public art. With the continuous evolution of new technological modeling and interactive intelligent functions, it has become a new art form. Based on the development of smart cities, this paper deeply analyzes and examines the main types and development of smart art in public art [14]. In order to enhance the reliability, stability, and antifailure capability of the urban street lamp intelligent monitoring and management system, and effectively improve the work efficiency of the urban street lamp intelligent monitoring and management system, most of the traditional processing solutions are based on server-centralized data processing, which is not suitable for this system. For this reason, edge computing

technology is used to realize data decentralization processing. As shown in Figure 1, the system consists of three layers: edge perception layer, transport layer, and service layer. The form of sensing technology includes optical sensing, gesture sensing, environmental sensing, infrared sensing, electromagnetic sensing, gravity sensing, and 3D sensing.

As a key carrier of urban environment and space culture, public art can be combined with urban planning and architectural design to create the overall image of the city. The size of the art work itself and the size of the open space are two important factors that affect the overall artistic effect of the work. If the scale is too large, it will make people feel depressed and heavy; if the scale is too small, it will reduce its sense of existence. If public art is placed in an indoor space, it is important to consider the distance between the viewer and the work. However, if the public art is placed in the outdoor space and it is integrated with the surrounding environment, it is necessary not only to consider the audience but also to compare and analyze the surrounding environment of the public art. It can be seen that its size determines its sense of distance and intimacy in the open space. Therefore, it is necessary to seek communication and exchange in an appropriate scale and to echo and integrate with the urban space environment.

As shown in Figure 2, the street lamp node uses multiple sensors to collect external environmental information and uses the communication module to transmit the data collected by the sensors to the concentrator node. Due to the high randomness of the flow of people and vehicles on normal roads, in order to accurately detect the flow of people and vehicles in the past, the street lamp nodes with image processing capabilities are used to identify and count the flow of people and vehicles. According to the flow rate, the controller sends corresponding control commands to realize the periodic control of street lamp brightness. Inductive intelligent public art usually sets sensors inside the work and changes the original state of the work by receiving the changes of external airflow, creature's sound, or movement through the sensor.

The realization of networked control technology for street lamps is mainly divided into wireless and wired. With the rapid development of Internet of Things technology, wireless communication networking technology has gradually become the mainstream development trend [15]. Wireless networking technology is a network of multiple independent wireless nodes that communicate with each other through radio channels. Currently, widely used wireless communication technologies include the following: ZigBee, Wi-Fi, and wireless transmission (NFC). The comparison of these several wireless communication technologies is shown in Table 1.

As can be seen from Table 1, for the comparison of commonly used ZigBee and Wi-Fi communication technologies, ZigBee has certain advantages in terms of cost and power consumption. The main problem of Wi-Fi is that the number of connected network nodes is too small, and the power consumption is high. Although the price of NFC is low, the node power consumption is high, and the communication distance is short. From the current development trend, in order to achieve the goals of smart lighting, smart home, and smart city, the number of nodes for networking communication should be at least more than 20; so, ZigBee has the best chance to become the mainstream of wireless communication networking technology [16]. ZigBee is divided into three frequency bands according to the channel, and the channel range is 0 ~ 20. The specific data of the center frequency, upper limit frequency, and lower limit frequency of each channel are shown in Table 2.

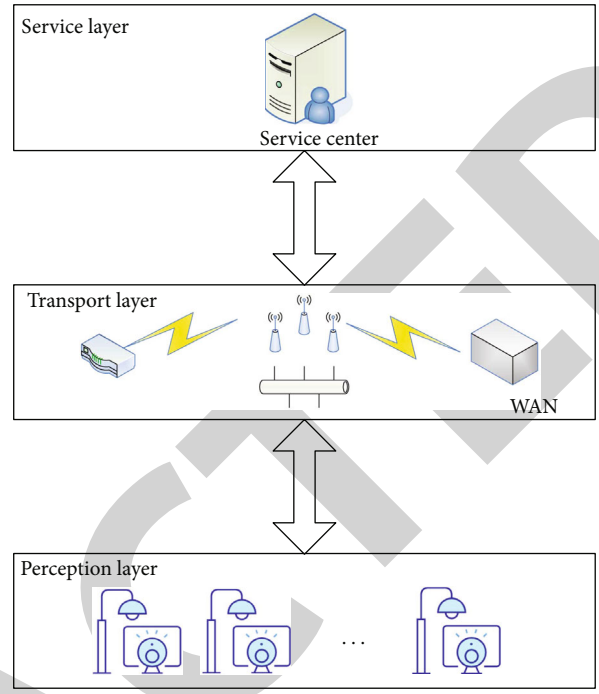


Figure 1: Overall frame figure of the system.

The comparison of the transmission rate and adjustment mode of the three frequency bands in Table 2 is shown in Table 3.

Up to now, public space is a public indoor space or outdoor environment with open space, free public participation, and experience, for example, streets, squares, outdoor venues in residential areas, parks, etc. Public art covers a rich variety of three-dimensional and dynamic art forms, based on the behavior of common presence that people communicate and share. Public art can be called public art when it echoes and integrates with its surrounding space and covers the interactive behavior of people in the space. ZigBee is a wireless communication technology, which is characterized by self-organizing network, short distance, low complexity, low power consumption, and low data rate and is mainly suitable for the field of Internet of Things and automatic control. The abovementioned street lamp control scheme has some inevitable defects, and the design scheme combining Internet technology and ZigBee technology can make up for these deficiencies [18]. Moreover, the ZigBee protocol can be used free of charge, thereby further reducing the cost of research and development [19]. In addition, the Internet technology is infiltrating all levels of social life with vigorous vitality. Therefore, using the urban public wireless network

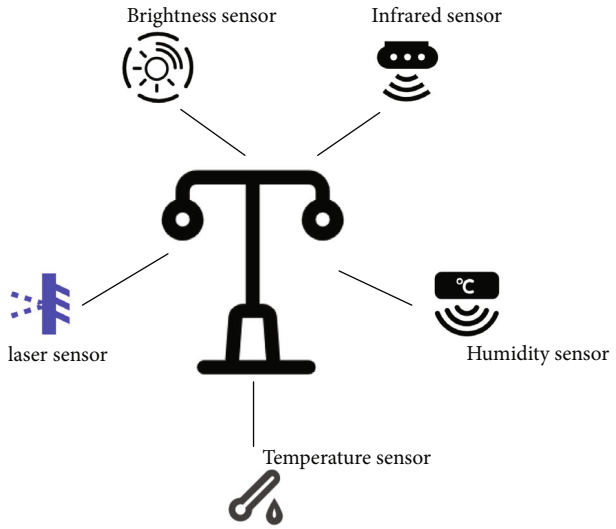


Figure 2: Street light node sensing design.

Table 1: Wireless communication technology comparison.

	ZigBee	Wi-Fi	NFC
Price	$4	$25	$2-4
Communication distance	1-100 M	0-100 M	0-20 M
Transfer speed	10-250 Kbps	60 Mbps	450 Kbps
Power consumption	Minimum	Big	Larger

Table 2: ZigBee wireless channel composition.

Channel	Center frequency (MHz)	Upper frequency (MHz)	Lower limit frequency (MHz)
$K = 0$	850.2	850.5	850.0
$K = [1, 10]$	908	910	900
$K = [11, 17]$	2405	2408	2400

coverage, the application scheme that integrates the Internet and the Internet of Things technology can truly form complementary advantages. While avoiding the previous technical defects, it can adapt to more complex equipment communication and control scenarios in the future. It provides a comprehensive solution for the urban street lamp control system that integrates many advantages such as low power consumption, high efficiency, flexibility and autonomy, intelligence, easy maintenance, easy expansion, and remote control [20].

To accomplish the autonomous and smart administration of urban highway luminaires and to accomplish the aims of resource efficiency, sustainable pollution prevention, and individualized treatment, it is the prime goal of research street lamp controller. The intelligent street lighting system can essentially be modeled as a unique simulation environment with widely separated nodes but clear distribution principles. Its node distribution essentially matches the setting of metropolitan road traffic. The complete electronic circuit network is installed on this feature. Feedback is needed for implementing game controller for lamp posts. Consider each road like a central processing unit from such a local standpoint, where many neighboring lamppost terminals are sequentially distributed geographically, and it is easy to form a linear communication system that is related step by step. From a global perspective, multiple such linear communication systems can form a large metropolitan area network communication system [17]. Therefore, based on the above feature abstraction, the prototype of the urban street lamp control system is obtained as shown in Figure 3.

Table 3: Comparison of three frequency bands.

Working frequency (MHz)	Transmission rate (Kbit/s)	Adjustment method
2405	255	O-QPSK
2408	45	BPSK
2400	25	BPSK

As per the conceptual model in Figure 3, a sizable broadband transceiver must be built in implementing consolidated online administration of dispersed urban lamp post nodes. The TCP/IP standard family's internetwork paradigm is the ideal option for long-distance interaction because it has an excellent long term and mature technology [21]. However, the deployment of virtualization technology by virtue of purely network designs to each lamp postcluster will be enormous for a size up city due to the numerous light pole nodes and the complicated distribution. From a variety of angles, including financial cost, implementation problems, Internet challenges, and operational battery life, it is improper. In order to enable the light pole nodes dispersed more along carriageway to build a network connection using the wireless medium, the route is employed as a legal subdivision unit. Afterward, use the entryway to surf the content using the other circuit as a sizable motherboard. This thus divides and optimizes the design methodology while still meeting the needs of protracted interaction, which lessens the total complexity of the layout. Additionally, the establishment of a small Internet of Things connecting lamp postnodes can partially achieve the regional control of the luminaires, increasing the updated daily of the total road led lamps. The street light system may now be remotely controlled since the lamp node connection is now directly hooked up to the Internet via the portal, allowing its node intelligence to be instantly stored to a cloud host and analyzed and used by mayors via a different site [22].

3.2. Weighted Information Fusion Algorithm. In practical application, information fusion technology has huge potential and is welcomed by many industries. Among them, it shines even more in the field of Internet of Things, and a variety of smart products of the Internet of Things have appeared in the civilian market, such as sweeping robots and intelligent drones. This is all thanks to the information

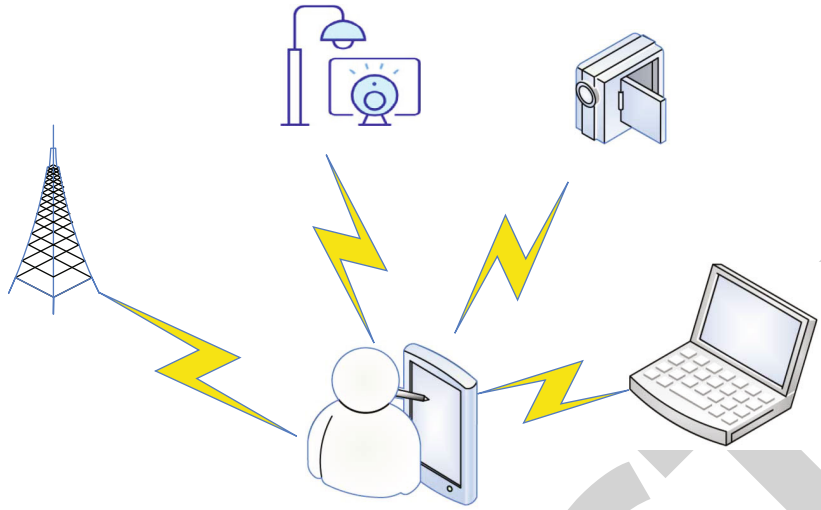


Figure 3: Device interaction association.

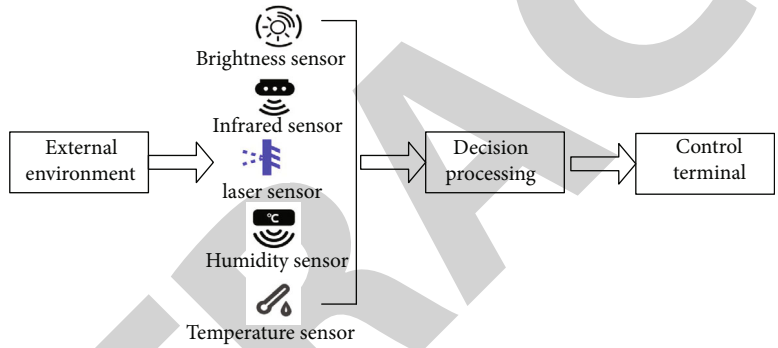


Figure 4: Sensor human and vehicle detection.

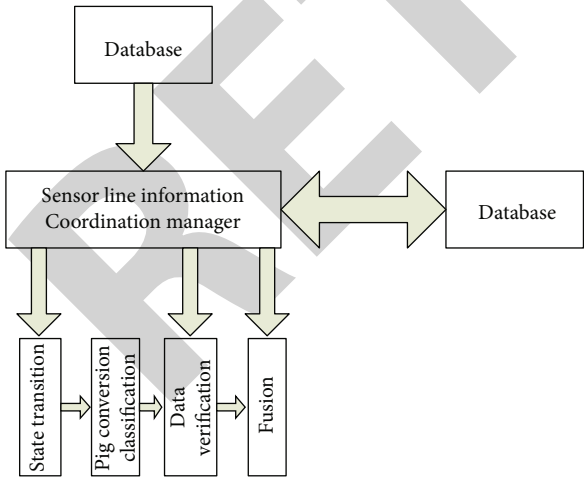


Figure 5: Multisensor information fusion.

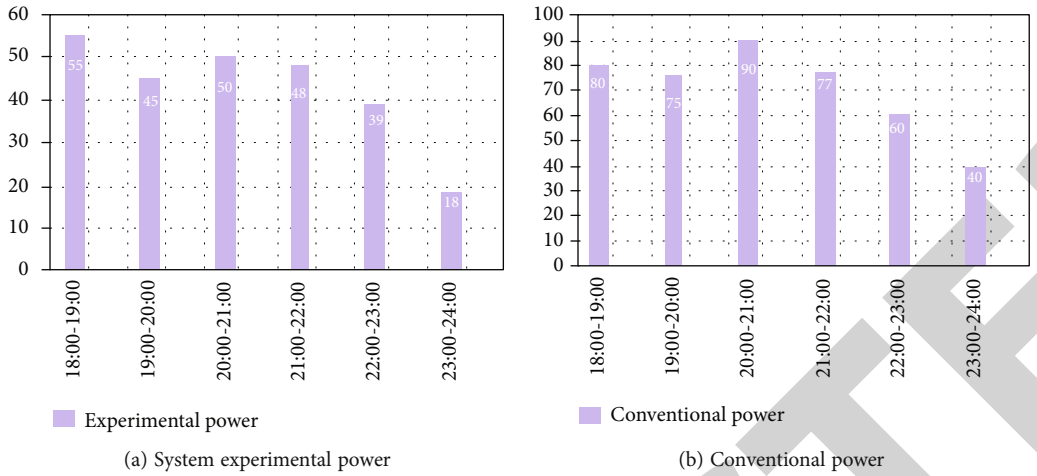
fusion technology, which realizes multisource information detection of targets and improves the object recognition rate, using computer technology to automatically analyze and comprehensively process the observation information of several sensors obtained in time series under certain criteria, so as to complete the required decision-making and estimation tasks and the information processing process. For information-related, combined and analyzed by multisensing equipment, information with higher comprehensive value can be obtained [23]. The average value fusion algorithm usually uses a mathematical average formula, which is a sensor with roughly the same weight value selected, abbreviated as MVFA. Assuming that multiple sensors in the m-sensor fusion system evaluate the state of the same target, the combined state evaluation scale satisfies the following conditions:

$$\hat{i} = \sum_{a=1}^{m} v_a i_a, \tag{1}$$

$$\sum_{a=1}^{m} v_a = 1. \tag{2}$$

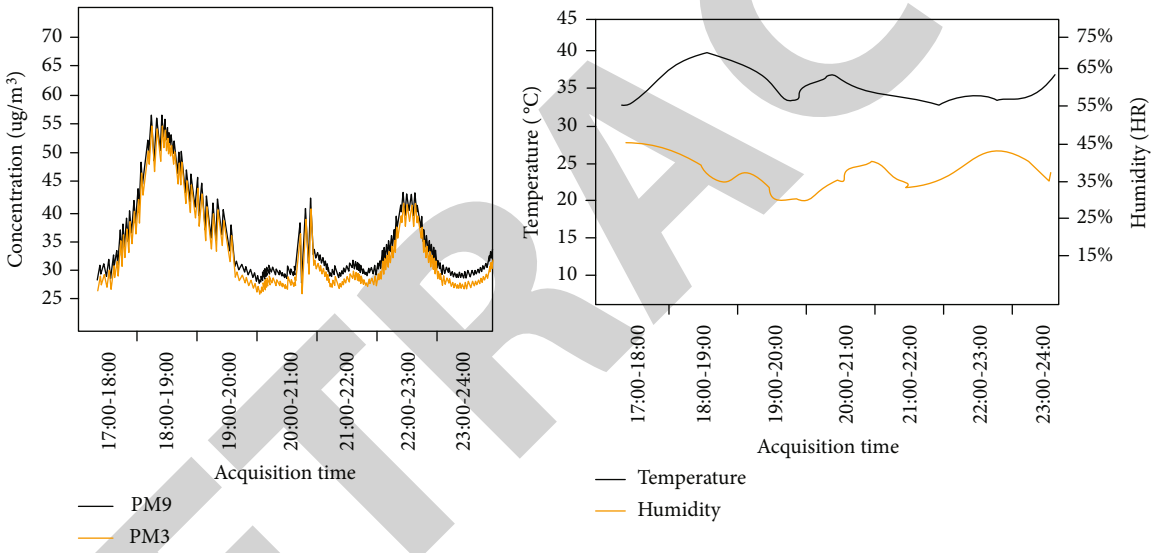
The state estimate after local fusion is

$$\hat{i} = \sum_{a=1}^{m} v_a i_a = \frac{1}{n} \sum_{a=1}^{m} i_a. \tag{3}$$



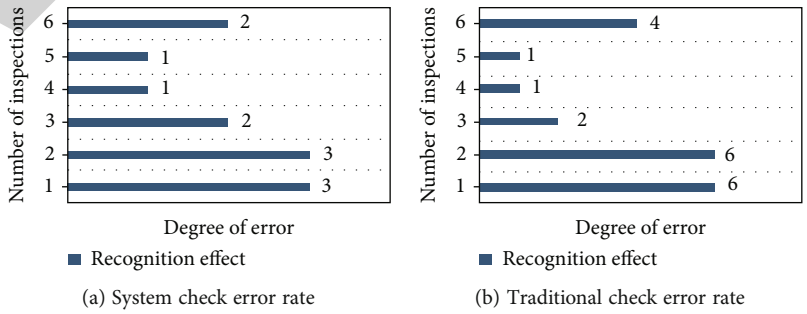
(a) System experimental power (b) Conventional power

Figure 6: Comparison of experimental power and conventional power of smart street lamps.



(a) Smart street light sensors collect data (b) Temperature and humidity collected by smart street lights

Figure 7: Only street light sensor data collection.



(a) System check error rate (b) Traditional check error rate

Figure 8: System check and traditional check error comparison.

The total mean squared error is

$$\partial^2 = A\left[\left(i - \overset{\Lambda}{i}\right)^2\right] = A\left[\sum_{a=1}^{m} v_a(i - i_a)\right]^2, \tag{4}$$

$$\partial^2 = A\sum_{a=1}^{m} v_a^2(i - i_a)^2 + 2\sum_{\substack{a=1,b=1 \\ a\neq b}}^{m} v_a(i - i_a)v_b(i - i_b), \tag{5}$$

$$A[(i - i_a)(i - i_b)] = 0. \tag{6}$$

So the total mean squared error is

$$\partial^2 = \left[A\sum_{a=1}^{m} v_a^2(i - i_a)^2\right] = \sum_{a=1}^{m} v_a^2 {\partial_a}^2. \tag{7}$$

For the weighted average algorithm, the total mean squared error is

$$\partial^2 = \frac{\sum_{a=1}^{m} v_a^2}{m^2}, \tag{8}$$

$$f(v_1, v_2, \cdots, v_m, \lambda) = \sum_{a=1}^{m} v_a^2 \partial_a^2 - \lambda\left(\sum_{a=1}^{m} v_a - 1\right). \tag{9}$$

Build a system of formulas:

$$\frac{\delta f}{\delta v_a} = 1 - \sum_{a=1}^{m} v_a = 0, \tag{10}$$

$$v_a = \frac{\delta_a^{-2}}{\sum_{a=1}^{m} \delta_a^{-2}}. \tag{11}$$

With the passage of time, the accumulation of perceptual information, the gray number measurement of each unit gradually becomes smaller, but the information of each sensor may also conflict, making the gray measurement larger. The gray fusion algorithm does the following processing. When the information is consistent, the reliability weight P is introduced:

$$x_{ab} = \min(1, x_{ab} + P), \tag{12}$$

$$x_{ab} = \max(0, x_{ab} + P). \tag{13}$$

When the information is consistent, the gray measurement adjustment weight is introduced:

$$x_{ab} = \frac{x_{ab}A + x_{ab}K}{A + K}, \tag{14}$$

$$x_{ab}^{-1} = \frac{x_{ab}(-A) + x_{ab}(-K)}{A + K}. \tag{15}$$

The process is a continuous refinement of its estimates, assessments, and evaluation of the need for additional sources of information, as well as a process of continuous self-correction of the information processing to obtain improved results. The human-vehicle detection system based on information fusion is a complex system with strong anti-interference, high accuracy, comprehensive, and reliable measurement information [24]. Traditional street light systems mostly use single-source feature information as a control factor, which makes the measurement information often not meet the ideal system value requirements [25]. According to a variety of scene factors affecting urban traffic lighting, a multidirectional study is carried out, and a reasonable and reliable multisource information fusion street light control scheme is obtained in combination with actual needs. The scheme architecture is shown in Figure 4.

Combining information from multiple sensors combines additional or redundant information from multiple sensors in time or space according to certain criteria to obtain a consistent description or interpretation of the object being measured. Its main purpose is to obtain more information by combining information rather than the individual elements present in the input information, which is the result of optimal synergy, that is, using a combination or combination of several sensors to improve the sensor system. Figure 5 shows the multisensor information fusion process.

For the night road environment, multisensors are used to collect multisource information, and the crowd vehicles on the road are used as the information source collection objects. Due to the large demand for hardware devices such as sensors for equipment deployment, in order to reduce costs and take into account performance, the main sensors used in the system are temperature, humidity, brightness, infrared, and other sensors, which effectively reduces the error rate of system measurement information. Different sensors detect objects in the external environment and convert the physical information of different sensors into digital information and send them to the decision-making processing layer. Finally, the obtained decision-making information is sent to the street light control terminal. As the executive body of the system, the street light control terminal calculates the corresponding street light control command according to the decision information and actively regulates the street light switch.

4. Realization of Intelligent Street Lights in Urban Public Spaces

4.1. Adjustment of Street Light Data before Testing. The edge processing function of the centralized controller of smart street lamps is reflected in the analysis and processing of data. Data analysis includes power data analysis and environmental parameter analysis, and data processing refers to the processing of image data. The voltage of the smart street lamp is set to 220 v, the current is 32 A, the status of the street lamp is monitored in real time by controlling the current and voltage data, and the abnormal status is dealt with in time.

4.2. Power Test of Smart Street Light Public Art. According to the experimental results, it can be known that the core controller conveys different control commands to the street light

controller according to the real-time information of the road, and the street light controller controls the light and dark of the street light. The intelligent street lamp control system designed in this paper can realize intelligent control of street lamps without personnel management and can achieve the effect of saving energy. To this end, specific data on changes in street lights are collected. A total of six hours of monitoring from 6 : 00 p.m. to 12 : 00 p.m., with a statistical interval of 1 hour each time, calculate the approximate power consumption for six hours at night from the lighting duration at different times. The monitoring data results are shown in Figure 6:

As can be seen from the figure, the power consumption of the street lamp system designed in this paper is much lower than that of the conventional lighting system. The street lamp intelligent control system designed by the sensor and weighted information fusion algorithm can realize the purpose of saving electric energy under the premise of intelligently controlling the street lamp lighting. From the simulation point of view, the intelligent street light control system can save a lot of power compared with the conventional street light control, especially between nine o'clock and ten o'clock, it can save 44% of the power consumption, during a six-hour period a night, and the overall power saving is 40%.

4.3. Smart Street Light Sensor Data Collection. In order to more intuitively display the data collected by the smart street light centralized controller, some environmental parameters actually collected are taken as an example for specific analysis. Access to the smart street light centralized controller randomly selects the PM9 and PM3 concentration monitoring data for six hours from 6 : 00 pm to 12 : 00 pm and depicts the 6-hour period as a line figure as shown in Figure 7.

Through the analysis of environmental parameters, not only can the urban air environmental quality and climate conditions be indexed but also the equipment environment and equipment operating conditions can be analyzed in combination with power data, figures, and other data. For example, it can be seen from Figure 7 that during the 6 hours, the temperature and humidity of the external operating environment of the smart street light centralized controller at night are normal and relatively stable. If abnormal temperature and humidity are detected, the power should be cut off in time to avoid more serious damage. In addition, through the combination of illuminance and power data, it can also monitor whether the street lights are normally illuminated or support intelligent functions such as automatic dimming.

In order to further judge the error of the system algorithm, the temperature and humidity in the environment are detected by the traditional inspection method and the inspection method of the system algorithm. The detection results are shown in Figure 8.

According to the abovementioned system detection of temperature and humidity through smart street light sensors and the results of traditionally believed detection, the number of errors detected by the sensor system is controlled to be less than three times, and the number of errors of traditional human detection is less than six times. The system test error rate is 1/2 of the traditional test error rate, and the accuracy is much lower than that of traditional measurement methods compared to traditional measurement methods. Therefore, the measurement of smart street light sensors can greatly improve the efficiency, and the test accuracy is also quite high.

5. Conclusion

The placement of public art forms a harmonious and unified whole with the surrounding landscape, architecture, and urban environment space. It is a combination of sensibility and rationality and is even more inclined to the proportional scale of the rational range. Through the intelligent system of intelligent street light sensor and weighted information fusion, the actual data of the power consumption of the lighting system and the power consumption of previous lighting in a period of time are recorded, and the results are analyzed. Finally, it is concluded that the designed system can achieve the effect of saving electric energy. Ready-made products and challenges centered on new media technologies. The public art of the future must rely on science and technology and regard art as a form of expression of technology. Through these technologies, public art is not only a work of art but also an object of emotional communication, bringing new ideas to people's boring life.

Data Availability

Data can be obtained by contacting the authors.

Conflicts of Interest

We confirmed that there is no conflict of interest.

Acknowledgments

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References

[1] S. Yin, B. Deng, and D. Zhao, "Public art plan of smart industrial area in China," *Arts Studies and Criticism*, vol. 3, no. 1, pp. 80–86, 2022.

[2] A. Cayer and C. T. Bender, "Beyond public: architects, activists, and the design ofakichiat Tokyo's Miyashita Park," *Architectural Research Quarterly*, vol. 23, no. 2, pp. 167–178, 2019.

[3] E. Crte-Real, "Arachne's loom: a public art drawing for porto design biennale 2019," *Drawing Research Theory Practice*, vol. 5, no. 1, pp. 147–164, 2020.

[4] S. Darivemula, A. Stella, F. Fahs, K. Poirier-Brode, and K. Ko, "The white coat public art project: using the white coat as a canvas for reflection for women in medicine," *Public Health*, vol. 194, no. 12, pp. 260–262, 2021.

[5] B. Yang, "Research on application of vehicle-mounted gas sensor in the age of AI," *Transducer and Microsystem Technologies*, vol. 41, no. 9, pp. 156–160, 2022.

[6] C. Chahine, C. Vachier-Lagorre, Y. Chenoune, R. el Berbari, Z. el Fawal, and E. Petit, "Information fusion for unsupervised image segmentation using stochastic watershed and Hessian matrix," *IET Image Processing*, vol. 12, no. 4, pp. 525–531, 2018.

[7] V. Yaghoubi, L. Cheng, and W. V. Paepegem, "A novel multi-classifier information fusion based on Dempster–Shafer theory: application to vibration-based fault detection," *Structural Health Monitoring*, vol. 21, no. 2, pp. 596–612, 2022.

[8] L. F. Herrera-Quintero, J. C. Vega-Alfonso, K. Banse, and E. Carrillo Zambrano, "Smart ITS sensor for the transportation planning based on IoT approaches using serverless and microservices architecture," *IEEE Intelligent Transportation Systems Magazine*, vol. 10, no. 2, pp. 17–27, 2018.

[9] F. C. Chuang, C. L. Chang, Y. N. Chow et al., "Application of water tank employing smart sensor for thermal?Electric energy conversion on vehicles," *Sensors and Materials*, vol. 32, no. 1, pp. 135–148, 2020.

[10] F. Morais, P. Carvalhaes-Dias, L. Duarte, E. Costa, A. Ferreira, and J. S. Dias, "Fringing field capacitive smart sensor based on pcb technology for measuring water content in paper pulp," *Journal of Sensors*, vol. 2020, Article ID 3905804, 13 pages, 2020.

[11] K. Q. Wang, "Application and development trend of light sensor," *Sensor World*, vol. 27, no. 2, pp. 1–5, 2021.

[12] L. E. Dunne and J. A. Ward, "Making sensors, making sense, making stimuli: the state of the art in wearables research from ISWC 2019," *IEEE Pervasive Computing*, vol. 19, no. 1, pp. 87–91, 2020.

[13] C. Orlowski, P. Cofta, and A. Orlowski, "The rule-based model of negentropy for increasing the energy efficiency of the city's digital transformation processes into a smart city," *Energies*, vol. 15, no. 4, article 1436, p. 1436, 2022.

[14] Y. He and J. L. Liu, "Research on the development trend of smart public art under the background of urban renewal," *Journal of Green Science and Technology*, vol. 24, no. 9, pp. 81-82, 2020.

[15] Z. Q. Meng, X. K. Liu, H. A. Zhou, X. Tong, and Y. Zheng, "Research on wireless street lamp controller based on NB-IoT," *Journal of Hunan University (Natural Sciences)*, vol. 48, no. 12, pp. 146–152, 2021.

[16] Y. Liu and D. H. Zhao, "Research on modeling and performance simulation of mobile ZigBee node wireless sensor networks," *Computer & Digital Engineering*, vol. 50, no. 2, pp. 332–338, 2022.

[17] H. Liu, "Design of urban lighting intelligent monitoring management system based on GPRS," *China Illuminating Engineering Journal*, vol. 31, no. 6, pp. 171–174, 2020.

[18] P. Wen, "The design of intelligent management system for streetlight based on ZigBee," *Techniques of Automation and Applications*, vol. 37, no. 12, pp. 176–180, 2018.

[19] D. S. Pereira, M. R. De Morais, L. B. P. Nascimento et al., "Zigbee protocol-based communication network for multi-unmanned aerial vehicle networks," *IEEE Access*, vol. 8, no. 8, pp. 57762–57771, 2020.

[20] Y. Y. Zhou and S. Hu, "Wireless sensor network and networking design for smart street lamp monitoring system," *Automation & Instrumentation*, vol. 36, no. 10, pp. 100–103+108, 2021.

[21] A. Masri and M. Al-Jabi, "Toward IoT fog computing-enabled system energy consumption modeling and optimization by adaptive TCP/IP protocol," *PeerJ Computer Science*, vol. 7, article e653, 2021.

[22] Y. H. Yang, L. X. Ma, X. N. Wang, X. F. Qiu, and Y. Y. Zhang, "Design of intelligent control system for urban street lights based on internet of things technology," *Journal of Huanghe Sci&T College*, vol. 24, no. 2, pp. 36–43, 2022.

[23] Y. Li, M. Zhao, M. Y. Xu, Y. F. Liu, and Y. C. Qian, "A survey of research on multi-source information fusion technology," *Intelligent Computer and Applications*, vol. 9, no. 5, pp. 186–189, 2019.

[24] Q. Han, "Research on energy-saving control strategy of street lamps based on multi-sensory information fusion and edge computing," *Internet of Things Technologies*, vol. 10, no. 10, pp. 43–45+49, 2020.

[25] L. M. Bao and X. M. Yu, "Development of intelligent street lamp system: a summary," *Journal of Eastern Liaoning University (Natural Science Edition)*, vol. 23, no. 4, pp. 266–271, 2016.