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Research Article

Strategies to Promote Smart City Cultural Scene Construction through Multi-Sensor Fusion Data

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The improvement of the level of market economy has driven the rapid development of urban culture, and urban cultural space, as one of the components in the overall development of smart cities, plays an irreplaceable and key role in the display of urban spiritual connotation and style. Today's urban cultural construction is not only limited to cultural individuals but also a comprehensive construction work that needs to be considered and coordinated with the overall development of the city. However, in today's cultural space construction, there are few cultural space construction strategies that can integrate economic characteristics, spatial characteristics, and cultural characteristics. This paper incorporates multisensor data fusion technology into a strategy for building cultural spaces in smart cities, and the theoretical basis of smart city cultural space construction is combined with multisensor functional model and fuzzy integral algorithm, and the realization of cultural space strategy is studied. And compared with traditional methods, it provides scientific basis for actual construction work in the aspects of collection, analysis, estimation, and integration of urban cultural environment and spatial information of cultural space construction. The final experimental data show that the method in this paper can achieve up to 96.2% integration of the cultural space in the experimental development area, which verifies the effectiveness and feasibility of this method. If it is popularized in the current stage of smart city cultural space construction, it can effectively improve the degree of spatial coordination and spatial effect.

1. Introduction

Countries around the world continue to integrate information technology into various industries, and the informatization strategy is intensifying. Many countries have even taken the construction of smart cities as the primary task to improve the level of urban development. However, cultural space occupies a very important position in the construction of the entire smart city and is increasingly becoming a major driving force for urban development. In recent years, under the guidance of the market environment, the speed of economic development in various regions has entered a new stage, and the concept of urban cultural space has been constantly mentioned and gradually become the focus of attention. It can improve the cultural level and vitality of the whole city and enrich the city's image and spiritual connotation. However, the construction of smart city cultural space often needs to comprehensively consider many factors, and in the current construction work, there has been a lack of effective strategic guidance. It makes the urban cultural space far from meeting the growing needs of the masses, and the unbalanced supply and demand will affect the sustainable development of the entire urban economy and other industries. Therefore, in order to improve the level of smart city cultural space construction, it is necessary to combine the characteristics of the times with modern science and technology.

Multisensor data fusion technology is another technical field developed in the process of continuous improvement of communication technology. The difference between it and a single sensor is that it can integrate different information provided by a homogeneous sensor and eliminate various interference factors to realize the complementarity of various information and achieve the accuracy of system environment perception and fusion decision making. Nowadays, these technologies have begun to try to integrate with various industries in the market. For example, it has given full play to its application value in professional fields such as aviation, medical treatment, remote sensing, and military. It has promoted the development of the industry and improved the core competitiveness of the market. It is applied to the construction of smart city cultural space, which can improve the quality and effect of construction work.

This paper combines the multisensor data fusion method to analyze the current stage of smart city cultural space construction. According to the experimental data, it can be found that in the collection of urban environmental information, the collection coverage rate of cultural venues by the method proposed in this paper is over 90%, and the coverage rate of cultural resources collection is over 86%. In terms of cultural spatial information resolution, the multisensor data fusion in this paper has achieved a comprehensive average of 0.28% and above for the cultural characteristics and cultural function resolutions of developing regions. In the analysis of situation estimation and threat estimation, it can be found that the two estimations accuracy of the method in this paper reaches 84.3% and 88.1%, respectively, and the final fusion degree effect is also ideal, with an average fusion degree of 94.75%. It shows that the multisensor data fusion method has certain practical significance and guiding significance for the construction of smart city cultural space.

2. Related Work

Many scholars have conducted in-depth studies on the construction of urban cultural spaces in recent years. Agirbas divided Istanbul's urban space planning into three parts, namely material space, cultural space, and functional space. He believed that the division of urban space construction by types was a necessary measure to promote urban economic growth [1]. Based on the functionalism of urban construction space, M'Hammedi et al. focused on the construction and design of the unique architectural style and cultural space developed by the new city [2]. Aijun analyzed the actual value of urban cultural space construction from the perspective of social transformation and explored the important value of cultural space construction in promoting the transformation of rural culture, economy, and grassroots governance [3]. Xiangyu took the new urban development area as the research object and analyzed the relationship between the population vitality representation and the physical space of the new urban area [4]. Liao et al. investigated the traffic characteristics of urban space and the effect of underground crossing projects, and on this basis proposed an innovative method of space construction [5]. Ganguly drew on a low-income neighborhood and conducted exploratory research. He examined the different ways marginalized cities construct community spatial environments [6]. The construction of urban cultural space has undergone in-depth research by numerous scholars and has developed relatively maturely in the overall planning and construction of the city at this stage. However, the requirements for the development of urban culture are also constantly increasing. The demand for smart city cultural space construction strategies with multisensor data fusion technology as an auxiliary method has been significantly improved.

In order to gain an in-depth understanding of multisensor data fusion technology, this paper investigates its related application research. Rosa A classified different Sicilian honey varieties by comparing data from a single pattern and a fusion method and combined a potential electronic tongue and a computer vision system to achieve a satisfactory recognition rate [7]. Lu et al. studied the optimal state estimation problem for asynchronous multirate multiscale sensors with unreliable measurements and correlated noise, the system described different sensors at the highest sampling rate, and independently observed a single target at multiple sampling rates [8]. Bouain et al. proposed a multisensor data fusion embedded design and used it in vehicle perception tasks with stereo cameras, light detection, and ranging sensors [9]. A complex approach to two of the most demanding multisensor data fusion problems in remote sensing, namely panchromatic sharpening and the fusion of hyperspectral and multispectral data, is presented by Fe Ldt C [10]. A real-time gait detection algorithm based on piezoelectric thin films and motion sensors is proposed by Gao W to address the low accuracy of single-sensor gait analysis. On this basis, a fuzzy logic-based gait phase recognition method was proposed [11]. Hwang et al. considered a multisensor data fusion system using load cells and vision sensors when developing a flounder classifier for fish management in aquaculture systems [12]. These studies have made a good analysis of multisensor data fusion technology, but due to the rapid development of the times, the application of multisensor data fusion technology has expanded from a relatively professional technical field to urban construction and development. There are very few existing studies focusing on the construction of smart city cultural space.

3. Investigation on Smart City Cultural Space Construction and Multisensor Data Fusion

3.1. Theoretical Basis of Smart City Cultural Space Construction. Before studying the construction of urban space, the concept of smart city needs to be understood first. Smart city is a new stage of urban development, and its core idea is to form a self-organizing, self-adaptive, and evolutionary intelligent life body based on the spatiotemporal integration model, with gridded sensor network as its nerve endings. The key is a digital neural network and an autonomous decision-making system with real-time feedback (stimulate a response), and a conceptual model is given by combining grid technology and digital neural network technology, as shown in Figure 1.

Smart city should be an advanced stage of urban informatization development, and there are some differences between it and digital city; the details are shown in Table 1.

Smart city is the mapping of city functions in the information space, and the relationship between it and real city entities is shown in Figure 2. The activities of urban residents should rely on urban entities, process and transmit information through daily production and life, and use various

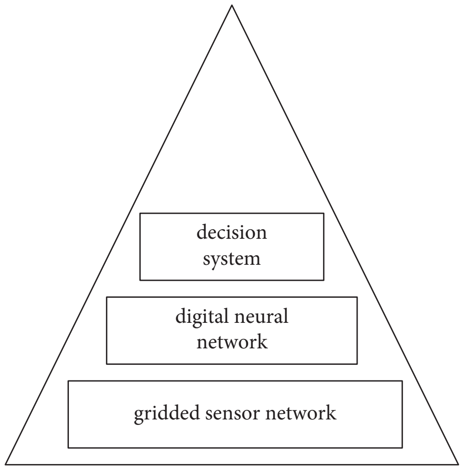

Figure 1: Theoretical model for smart cities.

urban functions provided by smart cities. It makes full use of various network infrastructure and resources to improve urban knowledge production and innovation capabilities and realize intelligent decision making and control of urban entities.

Space structure is the distribution and combination of urban elements in a spatial context and is the spatial expression of the economic and social structure of a city. It has three attributes of physics, society, and time. The three external indicators of urban density, urban layout, and urban form are mostly used to measure the specific manifestations of urban spatial structure in space and through these indicators to understand the inherent social, economic, and cultural attributes of urban spatial structure, as shown in Table 2.

In fact, in the existing academic field, there are not many studies on the analysis and practice of urban cultural space, so the definition of urban cultural space has not been unified. The urban cultural space referred to in this paper refers to the dominant performance of urban culture in the urban environment, in which urban culture contains two levels of material and humanities. The material environment space is the reflection of the humanistic level in the urban space, and it has always been an important carrier for the integration, orientation, maintenance of order, and succession of culture.

The classification of urban cultural space is helpful to refine the research objects, and from different research angles, combined with other disciplines, the understanding of urban cultural space can be more in depth. Combined with previous research results, there are roughly four common classification methods of urban cultural space, as shown in Table 3. It is classified according to spatial level or scale, divided according to cultural functions, divided according to the content and form of urban cultural space, and divided according to the basic characteristics of spatial elements (learn from Landscape). These classification methods draw on the relevant theories of "point," "line," and "surface" of urban imagery, which means that they are divided according to the content and function of space. In today's era of great cultural development and the rise of cultural consumption, it cannot completely cover all the concepts of urban cultural space. It will be omitted, or it may not match the land use classification of urban planning, resulting in conceptual confusion in the definition of docking planning.

Like the spatial structure of the city, the spatial structure of urban culture can be measured by three indicators: urban cultural density, urban cultural spatial layout, and urban cultural spatial form.

From some aspects of the city's culture and function, the city's cultural density represents the spatial aggregation degree and aggregation scale of cultural elements in the cultural spatial structure system. It can also further represent the distribution of various cultural spaces, cultural activities, cultural production, and cultural consumption activities in the space, such as the aggregation, adjacency, and degree of overlap.

In GIS, through density analysis, the measured points or lines can be generated into a continuous surface to find out where the points or lines are concentrated. And the kernel density analysis method is used to calculate the cultural element point aggregation status of the entire region according to the input cultural point element data, as shown in Figure 3, that is, the urban cultural density.

By defining a neighborhood around each cultural element point in GIS, adding the number of points in the neighborhood, and dividing by the area, the kernel density of cultural element points is obtained. Finally, the culture density is represented by a smooth grid surface. The value of the cultural element point is the highest, and it gradually decreases with the increase of the distance from the point.

Drawing on the concept of urban space layout, urban cultural space layout is the material cultural heritage, public cultural facilities, cultural business sites, and cultural industry space mentioned above as different functional areas of cultural space, and it is the location choice in the city. The coordinated development of urban spatial layout can improve the spatial and social benefits of urban cultural space, reduce the time and space costs of the flow of various cultural elements, and contribute to the enhancement of urban development momentum and the improvement of urban image.

Under the related effects of cultural factors, economic factors, social factors, and time and space factors, the location of cultural factors in cities with different densities is not evenly clustered in space, and the resulting spatial layout is the urban cultural space form. It contains not only the content of material space but also the influence process and mechanism of nonmaterial space.

3.2. Multisensor Data Fusion. On the basis of the theory of smart city cultural space construction, this paper analyzes the elements and key points of cultural space construction and how to fully integrate these elements with the reality of urban development. Effective collection and integration are the key and difficult points in the construction of the entire smart city cultural space. This paper introduces the characteristics of the multisensor data fusion method and tries to

Table 1: The difference between a smart city and a digital city.

Sequence	Feature	Digital city	Smart city
1	Informatization development stage	Beginner stage	Advanced stage
2	Technical focus	The popularization of information network	Intelligent decision
3	Relationship with the environment	Not involved	Harmonious development of people, technology, and environment
4	Information processing	Information fusion and sharing	Knowledge production

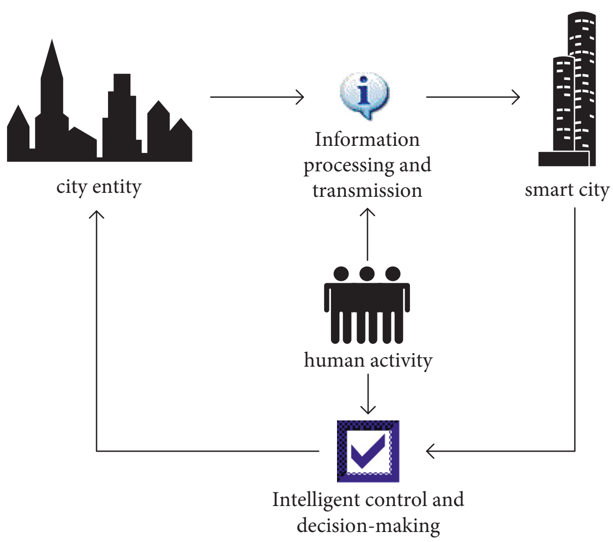

Figure 2: The relationship between smart cities and real urban entities.

use it in the analysis of urban environment to provide an effective strategy for the construction of cultural space.

Data fusion is not a new word in the application field, because from ancient times to the present, both humans and animals could integrate data in a shallow sense. Both humans and animals can collect information about the surrounding environment through their own perception ability to judge the status and safety of the environment or target and implement follow-up actions based on this. Even the perceived information may contain varying degrees of inaccuracy due to biases, limitations, etc. But they are still able to combine and complement each other's information. This is also the basic principle of multisensor data fusion, which fuses information from different directions obtained by multiple homogeneous sensors to achieve fusion functions that cannot be achieved by a single sensor.

The advantages of multisensor data fusion compared to a single sensor can be divided into 8 points:

(1) It is different from a single sensor, and the information from multiple sensors after data fusion has the characteristics and advantages of strong comprehensiveness and high precision.

(2) The information and data collected by multiple homogeneous sensors is redundant, and the main advantage of this redundancy is the reduction of sensor errors after integration. Because the noise between each group of sensors is not correlated, after integration, the noise value between each group of sensors will be reduced to a lower level, and the error of the sensors will also be reduced accordingly.

(3) The data and information collected by each sensor are incomplete, and multiple incomplete information has a certain complementary effect, which can make up for the inherent defects of a single sensor.

(4) Multisensor data fusion has strong reliability and security. Even if one group of sensors fails, other sensors can still be unaffected and operate as usual.

(5) It is more cost effective to use multiple sensors to collect information at the same time than to use a single sensor to collect information multiple times.

(6) It extends the spatial coverage and temporal coverage.

(7) It improves the spatial resolution.

(8) It increases the dimension of the measurement space.

Based on the analysis of the urban cultural space environment, we can initially establish a multisensor data functional model, as shown in Figure 4.

In the zero-level processing layer, the functional model will process the collected urban environment and various cultural space information according to certain standards, including processing operations such as sorting, analysis, and compression. This is to meet the processing requirements of the advanced processing layer on the order of these information and the amount of calculation.

In the first processing layer, the multisensor functional model fuses the environmental information collected by a single sensor and the estimation of the environment, respectively. The information between individual sensors is combined with each other to complement each other to obtain more accurate information and estimation. The processing work of this layer still belongs to the low-level processing, and the overall summary of the target space identification information can be obtained after the work of this layer is completed. According to the level of the identification information, the obtained information can be divided into four categories: detection information, positioning information, classification information, and identification information. Whether each type of information can be obtained depends on the performance of the sensor itself (resolution and signal-to-noise ratio of the input signal). In short, the better the performance, the more information can be obtained, and vice versa. This can be achieved by adjusting appropriate parameter values.

Table 2: Urban spatial structure.

Sequence	Components	Features
1	Urban density	Improve urban efficiency, make reasonable use of urban land and natural conditions, and establish reasonable and convenient transportation links
2	Urban layout	Economize the use of land and resources, reduce production costs, and facilitate the dissemination of information hand over and exchange
3	Urban form	Urban form is a comprehensive reflection of the internal density and spatial layout of a city, and it is the specific manifestation of the internal economic, social, and cultural externalization in space.

Table 3: Types of urban cultural spaces.

Classification	Sequence	Specific contents
Spatial hierarchy or scale classification	1	Macro level
	2	Mesoscale
	3	Microscale
Cultural function classification	1	Basic
	2	Iconic
	3	Enhanced
Classification of content and form of space	1	City node or landmark district
	2	Historic and cultural districts and traditional villages and towns
	3	Cultural and creative industry park
	4	Cultural business agglomeration area
Classification of basic features of spatial elements	1	Spots
	2	Corridor
	3	Plaque
	4	Matrix

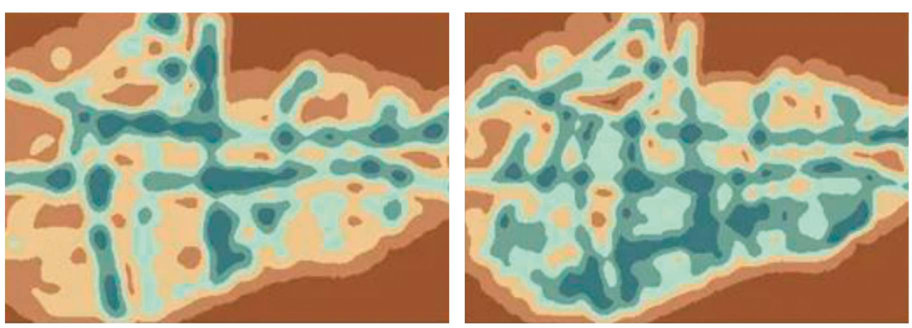

Figure 3: Urban cultural density based on kernel density analysis.

The second-level processing layer is mainly responsible for the estimation of the urban cultural development, including the extraction, analysis, and judgment of the urban cultural development. The estimates only consider the more likely situations because these situations must be extracted from actual data and objective facts. Therefore, in the second-level processing layer, the current situation can also be repeatedly described or explained based on this information, for example, the link between urban economy and urban culture and other development elements. After the integrated information obtained in the first layer is subjected to the situation estimation in the second layer, the understanding and cognition of the target environment can be deepened.

The third level of processing is threat estimation. Threat estimation mainly realizes the judgment of interference in the process of cultural space construction, including the judgment of factors such as the interference of cultural space to the overall coordination of the city and the interference to transportation convenience during the construction process. The biggest difference between it and situation estimation is that situation estimation only analyzes information of one type or the same direction, while threat estimation is often a multifaceted and quantitative analysis of the construction environment of the entire city.

Situation estimates and threat estimates need to be continuously adjusted and corrected in the fourth level of processing. And it judges whether the obtained information still needs to be supplemented, and whether it is necessary to adjust the processing layer algorithm to obtain the fusion result with higher accuracy [13].

Then, the cultural space is regarded as a fuzzy space, and the fuzzy integral is used for fusion analysis. Fuzzy integral is a nonlinear function defined on the basis of fuzzy measure, which has the ability to fuse multisource information. While letting X be the universe of discourse, Ω means that the membership function is the whole of measurable fuzzy sets, then the following definitions are made:

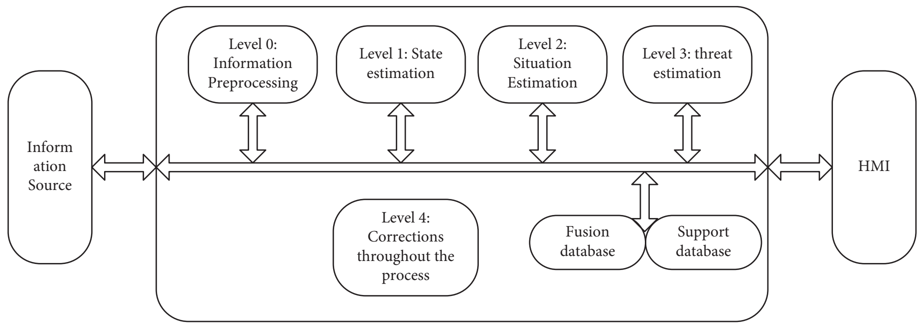

FIGURE 4: Multisensor data functional model.

(X, Ω) is a fuzzy measurable space, then the mapping $g(\cdot): \Omega \longrightarrow [0,1]$ that satisfies the next three conditions is called a fuzzy measure on Ω.

$$g(\Phi) = 0, g(X) = 1, \quad g(A) \le g(B). \tag{1}$$

If $A \subseteq B$, and if the measurable space of $\{A_i\}_{i=1}^{\infty}$ is monotonically growing, then [14].

$$\lim_{i \longrightarrow \infty} g(A_i) = g\left(\lim_{i \longrightarrow \infty} A_i\right). \tag{2}$$

Also, if for all:

$$A, B \subset X, A \cap B = \Phi, \lambda > -1. \tag{3}$$

Among them:

$$F_\partial = \{X : h(x) \ge \partial\}, \tag{4}$$

$g(\cdot)$ is a fuzzy function of $g_\lambda(\cdot)$.

Expression $\min(\partial, g(A \cap F_\partial))$ consists of two parts, one is ∂ and the other is $g(A \cap F_\partial)$ [15]. It is a fuzzy measure of a point set with a value of $h(x)$ not less than ∂, and its meaning is blur measurement on a value of $h(x)$. Since $g(A \cap F_\partial)$ is a decreasing function of ∂, the expression $\min(\partial, g(A \cap F_\partial))$ has these properties: When $g(A \cap F_\partial) \ge \partial$, it is a decreasing function of ∂. When $g(A \cap F_\partial) \le \partial$, it becomes an increasing function of ∂. Therefore, when $\min(\partial, g(A \cap F_\partial))$ changes with the change, it passes through an equilibrium position. The value of ∂ corresponding to this equilibrium position is a fuzzy integral value. It is m in Figure 5, so this value is also called the fuzzy mean of $h(x)$.

Fuzzy integrals have these basic properties:

For all $x \in X, 0 < x < 1$, if $h(x) = c$, then

$$\int h(x) \cdot g(\cdot) = c. \tag{5}$$

For all $x \in X$, if $h_1(x) \le h_2(x)$, then

$$\int h_1(x) \cdot g(\cdot) \le \int h_2(x) \cdot g(\cdot). \tag{6}$$

If $A \subset B$, then

$$\int h_A(x) \cdot g(\cdot) \le \int h_B(x) \cdot g(\cdot). \tag{7}$$

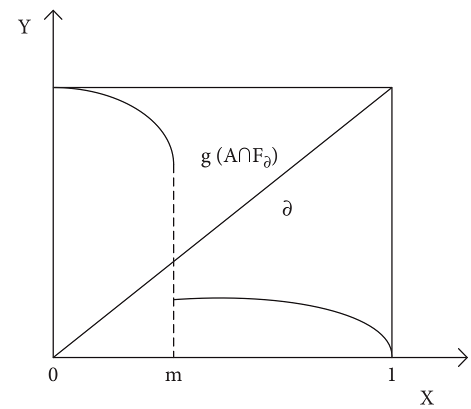

FIGURE 5: Interpretation diagram of fuzzy integral value.

For the convenience of calculating fuzzy integrals, it is assumed that

$$X = \{x_1, x_2, \cdots, x_n\} \tag{8}$$

It is a finite set and assumes:

$$h(x_1) \ge h(x_2) \ge \cdots \ge h(x_n). \tag{9}$$

If the condition is not met, its order can be adjusted to meet the condition. Then the fuzzy integral value is

$$e = \max_{i=1}[\min(h(x_i), g(A_i))]. \tag{10}$$

Among them:

$$A_i = \{x_1, \cdots, x_i\}. \tag{11}$$

When g is a fuzzy measure of g_λ, let:

$$g^j = \{g(x_j)\}. \tag{12}$$

Then, $g(A_i)$ can be calculated by the formula, which is expressed as

$$g(A_i) = g(\{x_i\}) = g^i, \quad g(A_i) = g^i + g(A_{i-1}) + \lambda g^i g(A_{i-1}) \; 1 < i \le n. \tag{13}$$

And λ can be obtained by solving the formula:

$$\lambda + 1 = \prod_{i=1}^{n} (1 + \lambda g_i). \tag{14}$$

Subset A	Φ	(X_1)	(X_2)	(X_3)	(X_1, X_2)	(X_1, X_3)	(X_2, X_3)	(X_1, X_2X_3)
$g_{3.109}$ (A)	0	0.1	0.3	0.2	0.493	0.362	0.687	1.0

Figure 6: Fuzzy measurements on sets.

In formula (16):

$$\lambda \in (-1, +\infty), \lambda \neq 0. \quad (15)$$

For a fixed set $\{g^i\}$, there exists a unique $\lambda \in (-1, +\infty)$ that satisfies formula (16).

As a simple example, a system of three sensors is considered, $X = \{x_1, x_2, x_3\}$, and its corresponding weight is $g^1 = 0.1, g^2 = 0.3, g^3 = 0.2$, then according to formula (16), λ can be obtained:

$$\lambda + 1 = (1 + 0.2\lambda)(1 + 03\lambda)(1 + 0.1\lambda) \quad (16)$$

Solving for $\lambda = 3.109$, the fuzzy measurement on set X is shown in Figure 6.

This idea can be integrated into the construction of smart city cultural space, and the multisensor functional model can be used for data fusion and calculation of various factors of the entire urban development environment. Through the influence of various factors in the overall planning and the size of the interference, the focus of cultural space construction and the problems to be avoided are judged and considered.

3.3. Realization of Smart City Cultural Space Construction Strategy. The multisensor fuzzy integral data fusion method proposed in this paper is applied to compile of the small cultural space construction strategy in the four major development areas of a city, which are divided into A, B, C, and D. The cultural environment and space of the development area are collected, analyzed, estimated, and finally integrated. The traditional method is used as a comparison to judge the rationality and scientificity of the cultural space construction project with the accuracy of the final fusion effect. The basic information of each development area is shown in Table 4.

3.3.1. Collection of Cultural Space Information. The collection of cultural space information is data collection for the existing cultural resources and cultural venues in each development area. The collection scope is within the entire development area. The coverage rate of each method is shown in Figure 7.

Figure 7(a) shows the collection results of cultural space information using this method.

Figure 7(b) shows the results of cultural space information collection by traditional methods.

Figure 7 shows that this paper has a wide range of cultural resources and cultural sites in the four major development areas based on the sensor data fusion method. Because cultural resources include implicit cultural resources and explicit cultural resources, and cultural sites are all explicit information. Therefore, on the whole, the collection coverage rate of cultural sites is generally higher than that of cultural resources collection. The collection coverage rate of cultural sites under the method in this paper is all over 90%, and the minimum coverage rate of cultural resources collection is 86.7%. In contrast, the collection effect of the traditional method is not very ideal. If the existing resources are not collected during the construction of the smart city cultural space, the orderliness of the entire planning work will be affected. The average coverage rates of traditional methods for collection of cultural resources and cultural sites are 77.10% and 81.43%, respectively, which is hard to meet the cultural development requirements of smart cities.

3.3.2. Analysis of Cultural Space Information. The analysis of cultural space information mainly focuses on the in-depth analysis of the collected regional cultural resources and the existing cultural place data information, mainly including cultural characteristics and cultural functions. The analysis results are shown in Figure 8.

Figure 8(a) indicates the analysis of cultural space information in this paper.

Figure 8(b) indicates the analysis of cultural space information by traditional methods.

It can be seen from Figure 8 that the resolution of cultural spatial information under the method in this paper is relatively high, and the comprehensive average of the resolution of cultural characteristics and cultural functions of the development area has reached 0.28% or more. From Table 4, it can be seen that the level of economic development in the four development regions is basically at the same level. If regional characteristics are to be brought into play, efforts must be made in terms of the characteristics of cultural space and the main functions of cultural space. Multisensor data fusion can well detect and analyze the unique features and functions of each development area and play a great role in promoting the construction of smart city cultural space. However, the comprehensive resolution of the traditional method is 0.19%, which cannot be used for feature recognition and function analysis.

3.3.3. Estimation of Cultural Space Information. Cultural space information estimation is based on the internalization of the previous information analysis results, and the accuracy of information estimation is very important for the entire cultural space construction work. This step is mainly to predict and judge the future construction work trend and interference factors or other influencing factors on the basis of the analysis results. The accuracy results are shown in Figure 9.

Figure 9(a) shows the estimation of cultural space information in this paper.

Figure 9(b) shows the estimation of cultural space information by the traditional method.

Table 4: Basic information on urban development areas.

Sequence	Development area	Population	Acreage	GDP
1	Area A	350,000	134 square kilometers	61.2 billion
2	Area B	440,000	157 square kilometers	56.1 billion
3	Area C	320,000	161 square kilometers	73.4 billion
4	Area D	470,000	155 square kilometers	59.7 billion

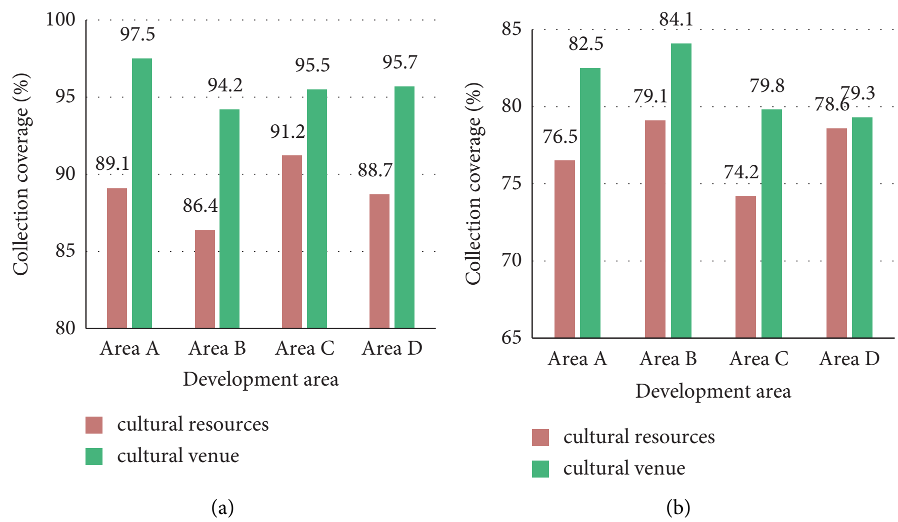

Figure 7: Cultural space information collection.

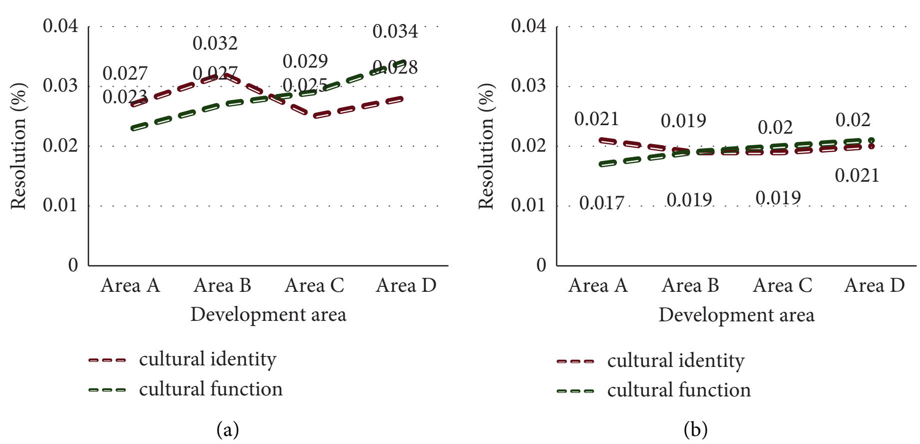

Figure 8: Cultural space analysis.

Figure 9 shows that the accuracy findings of situation estimation and threat estimation under the two methods are quite different, which may be because there are many unknown factors that are difficult to determine in the situation estimation. It includes factors such as urban economic development and cultural popular trends, resulting in low accuracy of situational estimation of cultural spatial information. However, in contrast, the accuracy of multisensor data fusion in estimating the spatial information of the four major development areas is slightly higher than that of the traditional method, up to 84.3%, while the traditional method is only up to 78.3%. In the threat estimation of factors affecting cultural construction, the comprehensive mean of the estimated accuracy of the method is 86.6%, and the traditional method is only 79.9%.

3.3.4. Cultural Space Integration. The fusion of cultural space is the last step of the entire smart city cultural space construction strategy, and it is also an important step to determine whether the construction work is reasonable and scientific. The fusion effect of the two methods is shown in Figure 10.

Figure 10(a) shows the cultural space fusion of the method in this paper.

Figure 10(b) shows the fusion of traditional methods and cultural spaces.

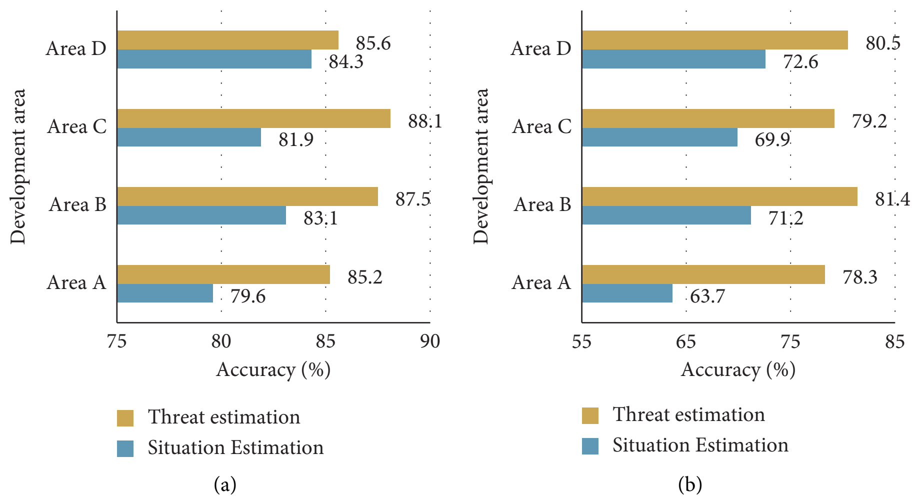

Figure 9: Cultural spatial information estimation.

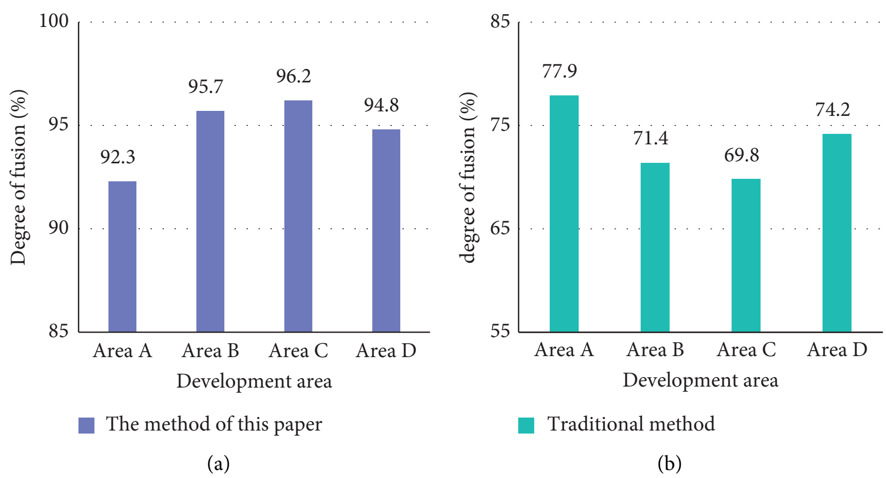

Figure 10: Cultural space fusion.

Figure 10 shows that in the process of data fusion of all information analysis and estimation results, the cultural space fusion results based on multisensors are ideal. The degree of integration of the four major development areas is 92.3%, 95.7%, 96.2%, and 94.8%, respectively. The cultural space fusion effect based on traditional method is poor, and the fusion degree is 77.9%, 71.4%, 69.8%, and 74.2%, respectively. If the cultural space and various factors cannot be effectively integrated, the development of social and economic effects affecting the city will be hindered. The method is different from traditional methods and has certain operability in this regard.

4. Conclusions

The new era background has promoted the development of a new urban culture. With the spread of economic globalization, people have higher requirements for urban cultural construction. Building a smart urban cultural space is one of the most important ways to balance material life and cultural life. This paper integrated multisensor data fusion into the strategy of space culture construction and effectively collected, analyzed, estimated, and integrated the environmental information of urban cultural development and offers a more science-based and reasonable decision-making basis for the construction of cultural space. It can contribute to the harmonious development of the city's economy and culture. In the actual construction of today's smart city cultural space, multisensor data fusion should be used to fully analyze the overall planning and local characteristics of the city. Only on the basis of objective data analysis conclusions and organically combining the characteristics of urban economic and cultural development, can a scientifically coordinated urban cultural space be established. This paper deeply analyzed the cultural space construction strategy of smart city, which alleviated the contradiction of urban development to a certain extent. But this paper still has many shortcomings. In the process of urban cultural environment and spatial information collection, this paper is carried out under relatively ideal conditions and does not consider other obstacles that will appear in the actual application process. In contrast, the research in this paper only examines the following aspects in practice the new development area of a certain city and does not consider the problem of scale. In future research work, more consideration will be given to the practical application function of data fusion methods in urban construction.

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 conflicts of interest.

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