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Research on Traditional Village Diversity and Living Inheritance Value from the Perspective of Spatial Gene Background

Hao Wu*
Doctor, Department of Fine Arts, International College, Krirk University, Bangkok,10220, Thailand
894597017@qq.com

Tao Shen
Professor, Department of Fine Arts, International College, Krirk University, Bangkok, 10220, Thailand
shentao777@126.com

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Abstract

The comprehensive and diversified value of living inheritance analysis has become more and more prominent in traditional villages, which have rich agricultural production resources, original ecological resources, and the living value of the village community and cultural inheritance. However, in the process of village diversity development and living inheritance value analysis, there are problems such as poor analysis effect and a small amount of analysis data. The main reason is that wireless Internet technology in rural areas is backward, which restricts the development of village diversity and living inheritance. Therefore, this paper proposes a diversity development analysis method based on spatial genes, which can plan the development and living inheritance of rural diversity in different regions. Firstly, wireless Internet technology is used to collect excellent diversified development data. The data is collected from different regions and then summarized based on spatial genes. This is, in turn, used to perform regional planning for development based on the local people's conditions and characteristics to achieve excellent and innovative development forms. Then, according to the concept of the spatial gene as the constraint, the transmission of living inheritance data, which is the spatial data, is done using wireless Internet technology through which the innovative form of diversified development of the underlying traditional villages is promoted. The results of the presented analysis of living inheritance are done through fusion analysis, transmission effect and accuracy analysis augmented with the support of wireless Internet technology. It can be observed that the concept of a spatial gene can improve the development level of village diversity, promote rural construction and strengthen village protection and development by using wireless network communication that adapts to the development of modern society and meet the needs of modern production space genes in rural areas.

Keywords: Spatial genes,Village, Diversity, Living inheritance, Value

1. Introduction

Traditional villages house rich cultural Heritage in tangible and intangible forms. The Heritage can take historical, cultural, artistic, scientific, economic and social dimensions. Under globalization and rapid urbanization, traditional village protection has declined significantly. This is further aggravated by the massive, rapid urbanization that transforms the traditional villages to the verge of cultural deterioration and extinction. This problem has now acclaimed global attention. The UNESCO World Heritage Center and the International Federation of Landscape Architects delineated a few principles that focus on preserving rural landscapes. These bodies also summarize the value as well as the characteristics of landscapes of villages apart from emphasizing their universality . Inheritance of the characteristics of traditional villages has become an integral part of human lineage.

The transmission of wealthy cultural traits across generations occurs via 'spatial genes.' These genes serve as a repository, chronicling the unique spatial attributes of traditional villages. This includes diverse genetic components such as the area's layout, its distinctive textures, clusters of buildings, and singular monolithic structures.

Wireless Internet is a global voice and data network that allows multiple users [1] to establish long-distance wireless connections [2], which enhances signal transmission rate and stability[3], realizes the processing of massive data that emanates from various types of sensors [4], and can significantly improve the effective transmission of data in different regions. Multi-terminal, The processing of massive sensor data involves extraction of signals, noise removal and other data preprocessing activities to clean the data. However, when wireless Internet is carried out, problems such as complex data [5] and frequent interference [6] often occur, affecting village diversity development characteristics. To this end, this paper integrates the concept of a spatial gene with wireless Internet technology, analyzes the development characteristics of diversity in different villages, extracts valuable data, and better integrates with their local cultural Heritage. The results are shown in Figure 1.

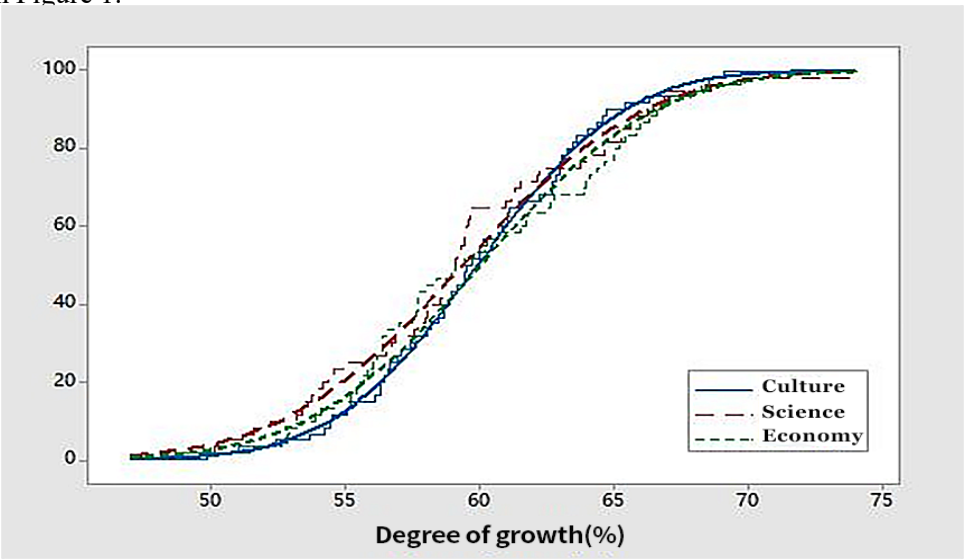

Figure 1. Rural Diversification Development Trend (data: average value 2012~2022)

Wireless Internet can be classified according to various standards such as coverage [7], distribution mode, transmission technology, etc., to provide multi-terminal communication requirements for information transmission [8], with broad coverage, efficient use of communication resources, and stable communication [9]. The multi-terminal communication requirement may include the specification of various access points, such as public and private points, a protocol for signal transmission etc. Therefore, broadband access, wireless Internet, wireless self-organization and IEEE 802.20 provide essential conditions for analyzing the characteristics of village diversity development in different regions, and the advantages of wireless Internet communication are shown in Table 1.

Table 1. Advantages of Wireless Internet (unit: %)

Index	Transfer lift rate	Stability and security
Wireless self-organization	49.84	66.87
Wireless self-organization	51.01	58.69
IEEE 802.20	52.44	60.96
Broadband access	53.70	59.47

The communication process for broadband access, wireless Internet, wireless ad hoc organization and IEEE 802.20 is shown in Figure 2. The signal from the source is given to the transmitter after converting it. The data analysis is done on the signal for extracting the values inherited as well as development data. These data are then sent to the trustee through the receiver.

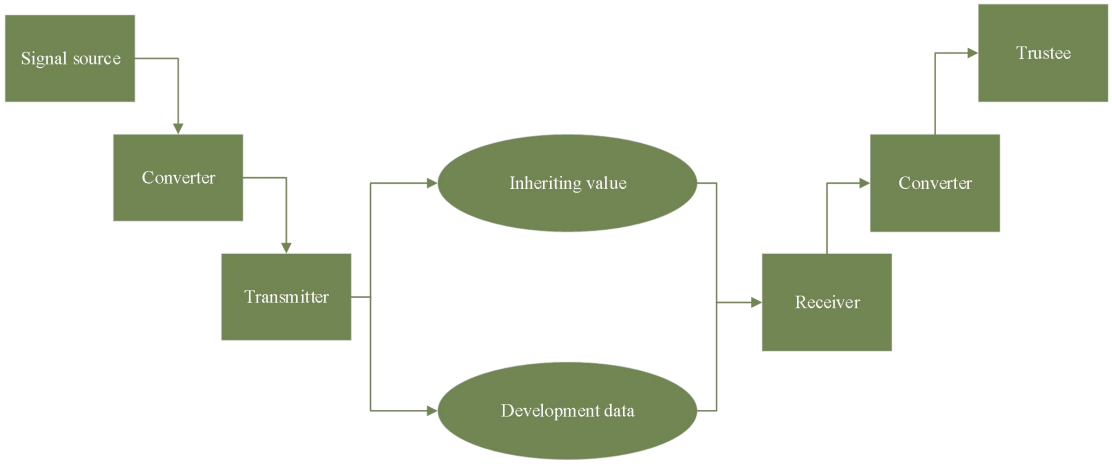

Figure 2. Fusion Process of Village Diversity Development Data from the Perspective of Spatial Genes

Broadband access, wireless Internet, wireless self-organization and IEEE 802.20 technology have the transmission advantages of high terminal utilization rate[10], sea quantification[11], and can realize the diversified development content of villages[12], and the value analysis of living inheritance. The approach integrates 'spatial genes' to streamline pinpointing characteristic data, thereby facilitating its efficient distribution. Concurrently, it delves into the cultural significance and regional traits influencing the evolution of village diversity. This method also assesses the performance and completeness of data through broadband connectivity, wireless internet, self-organizing networks, and the application of IEEE 802.20 standards [13].The work details the experiments such as transmission effect, Living inheritance paths and strategies, indices, range, development characteristics, content characterization, estimation of the value of living inheritance and accuracy. The results show that the spatial gene concept can improve the accuracy of characteristic data for rural diversity development and simplify the data dimension and complexity of wireless transmission in the context of village and space planning [14]. Broadband access, wireless Internet, wireless self-organization and IEEE 802.20 technology, and spatial gene concepts are applied to the analysis of rural diversity development[15], and the advantages and disadvantages of diversity development in different regions are compared. The analysis of key features encompasses the methodology of data dissemination, the prioritization of concepts, and the valuation of heritage. During the evaluation of village diversity evolution and the appraisal of living heritage values, emphasis should be placed on the efficacy of transmission. Therefore, the selection of network nodes is critical to optimize the data transmission rate. The methodology for choosing these network nodes is detailed in Table 2.

Table 2. Village Access Point Selection for Wireless Internet

Content	Number of wireless access points	Village access point selection
Images, documents, websites	1、4	2、5

Spatial genes	2、6	1、2、3
Residential life	7、9	2、4

As described in Table 2, broadband access, wireless Internet, wireless self-organization and IEEE 802.20 can independently select wireless and village access points according to the size of the transmitted data [16]. While this method efficiently disseminates data regarding the diversity development of villages across various regions, it falls short in recognizing, categorizing, extracting, and discarding non-essential elements of living heritage data. This limitation hampers the process of consolidating cultural heritage insights in rural development and tweaking pertinent parameters. Therefore, incorporating the notion of 'spatial genes' becomes essential to aid this process.

2. Related Work

2.1 Identification of different Inheritance Data for the Development of village diversity

Identifying living inheritance data mainly starts from production, life and ecology. The concept of spatial genes is through cultural inheritance [17], business transformation and industrial development based on protecting and excavating the history and humanities of villages, reducing the characteristic data indicators and adding correlation values, impact values, and development values to different living inheritance data collections. The combination of living inheritance data identification and spatial gene concepts can carry out massive transmission of living inheritance data and reduce the amount of network transmission [18]. The spatial gene concept can match access points, village access points, and transmit volume settings for diversity development and living inheritance data, and the specific transmission process is as follows.

Characteristic data of village diversity development: rural village cultural data is P_i, physical geography data is y, production resource data is *set (g)*, inheritance value calculation function is t, and the importance of characteristics is τ . Data collection on the characteristics of village diversity development is shown in Equation (1):

$$set(g) = P_i \sum \tau + y - t \tag{1}$$

Formula (1) estimates the inheritance value data of the village diversity development. The result of this expression can be used to identify, classify and eliminate the features to improve transmission efficiency.

The ranking of living inheritance indicators: weight ranking function, characteristic influence degree calculation function is *F(d)*, active inheritance index fusion degree ranking is $g(t_i)$, spatial gene concept ranking result is $r(y_i)$, and the ranking of living inheritance index is d , which as follows:

$$F(d) = g(t_i) + r(y_i) \tag{2}$$

Broadband access, wireless Internet, wireless self-organization and IEEE 802.20 transmission of village diversity development data: wireless transmission node is *put(x)*, node transmission function is ry_i , and characteristic data recognition transmission function is gt_i, The data processing process of living inheritance of village diversity development is shown in Equation (3):

$$put(x) = \frac{\min[\sum gt_i + ry_i]}{\sum gt_i + ry_i} \times 100\% \tag{3}$$

3. Methodology

3.1 Data Transmission Process of Living Inheritance based on Spatial Gene Concept

3.1.1 Wireless Network Transmission Processing of Living Inheritance Data

The data on village diversity and living inheritance exhibit inter-regional variations, necessitating the encryption of living inheritance data for pinpointing its crucial aspects and contextual relevance. Moreover, the impact of network latency on the transmission of village diversity data underscores the

need for the exclusion of non-pertinent developmental content, enabling a more streamlined processing of such data.

For a more effective assessment of living inheritance value, it's crucial to opt for the closest hardware device, which guarantees an optimal data transmission rate. The outcomes of this process are illustrated in Table 3.

Table 3. Data Transmission based on the Infrastructure used for Village Diversity Development

Genre of Data transferred	Router	Switchboard	Wireless access point	Server
Rural farming data	58.69	56.50	58.41	76.56
	58.69	63.78	62.61	75.37
	58.91	54.39	53.37	71.51
	58.98	62.17	60.21	73.95
	59.14	65.28	56.18	74.75
Rural living data	59.43	55.96	65.40	82.51
	59.48	51.15	66.81	78.56
	59.51	53.18	57.51	82.00
	59.69	54.16	57.62	71.24
	59.98	58.70	64.65	73.58
Spatial genetic data	60.00	53.56	56.40	82.00
	60.13	59.30	64.98	70.15
	60.71	53.39	55.44	77.13
	60.86	64.22	57.00	75.61

Table 3's examination of rural diversity development and living inheritance reveals robust data transmission integrity in areas like rural agriculture, community activities, and spatial genes. This suggests efficient functioning across various hardware device terminals.

3.1.2 Calculation of the Value of Living Inheritance Data

The data in Table 3 were summarized, the living inheritance data were calculated, and the results were shown in Table 4. In addition to this, the table shows the values for culture, spatial genes and ecological resources.

Table 4. Calculation of the Value of Living Inheritance

Test / The number of the surveyed village	Village culture	Spatial genes	Living value	Ecological resources
22	0.0574	0.5329	0.3500	0.9386
31	0.5367	0.5119	0.7865	0.1416
32	0.3790	0.8343	0.7748	0.7326
30	0.6170	0.0669	0.8316	1.0206
13	0.5544	0.0734	0.3713	0.4767
25	0.8795	0.2040	0.4140	0.7895
9	0.2214	0.4765	0.4811	0.3888
35	0.5342	0.5973	1.0092	0.4578
8	0.4653	0.4617	0.8944	1.1561
26	0.5398	0.7221	0.6937	0.9621

31	0.0929	0.9695	0.3696	1.0945
4	0.2374	0.9775	0.4027	0.2565
9	0.6429	0.7334	1.0044	1.0563
21	0.7004	0.3149	0.9587	0.0238

The living inheritance value should be designed using the spatial layout and structural matrix. Hence the villages that are surveyed should be assigned numbers. From the data in Table 4, it can be seen that under the background of spatial genes, the living inheritance values are accurately analyzed and integrated into the data of village diversity, and the data structure is reasonable, which meets the transmission requirements of broadband access, wireless Internet, wireless self-organization and IEEE 802.20. There's a noticeable disparity between the evolution of village diversity and the process of active inheritance. The prolonged wireless data transmission times across different regions point to the intricate nature and significant natural language component of active inheritance data, underscoring the need for simplification in data transmission. Furthermore, when comparing the data processing capabilities, the spatial gene concept achieves over 80% efficiency, whereas the transmission efficiency for living inheritance data lags at just 25%. This disparity highlights the necessity to streamline the living inheritance data further.

4. Experimental Analysis: A Case Study

4.1 Conditions for Broadband Access, Wireless Internet, Wireless Self-organization, and IEEE 802.20

Based on broadband access, wireless Internet, wireless self-organization and IEEE 802.20, this paper comprehensively analyzes the diverse values of history, culture, science, art, society and economy based on the characteristics of village diversity. Various network categories encompass personal area networks (PANs), local area networks (LANs), metropolitan area networks (MANs), and wide area networks (WANs). The detailed characteristics of each network type are presented in Table 5.

Table 5. Hardware Conditions for Wireless Internet, Wireless Self-organization, and IEEE 802.20

Device name	Transfer rate	Transmission side
Wireless Internet	300-600Mbps	1~3pcs
Wireless self-organization	4.5-6.9Gbps	4~7pcs
Wireless access device	4.5-9.6Gbps	3~6pcs
LTE	0.5-1Gbps	5~8pcs

Ecology

Production

Lifestyle

History and Culture

Figure 3. Sampling Results of Village Diversity Development

Figure 3 illustrates the foundational aspects and the tangible outcomes of the development of village diversity. Serving as a structural basis for this development, the core data primarily reflects the significance of living heritage. It's essential for living heritage to cultivate a strong sense of cultural awareness and confidence. The comparative analysis in Figure 3 demonstrates that technologies like broadband access, wireless Internet, self-organizing wireless networks, and IEEE 802.20 standards are effective in enhancing the value of living heritage within diverse development contexts. These technologies effectively represent the essence of folklore and diversity, enabling more precise integration of living heritage data. The results suggest that the analytical impact of these technologies is optimal. A comprehensive overview of this data is detailed in Table 6.

Table 6. Characteristics Analysis of Village Diversity Development

Village diversity development content	**Research directions**	**Number of spatial genetic indicators**	**Diversity**
Village characteristics	Rustic	6	78.59
	Ethnic group	2	79.47
Spatial characteristics	Traditional skills	6	71.96
	Featured Resources	7	78.39
	Local culture	7	70.48
Live features	Tradition	6	80.06
	More	5	72.15

5. Results and Discussion

5.1 Characteristic Extraction Process of Village Diversity Development

Traditional villages have long been based on natural resources such as land, vegetation and water sources within the village area and have carried out production activities such as crop cultivation, poultry breeding, grazing, hunting, fishing and traditional skills. The details of implementation are shown in Table 7.

Table 7. Characteristics of Village Diversity Development

Extraction method	**Characteristic indicators**	**The degree of feature analysis**
Content characterization	Land resources	69.51
	Forest resources	75.23
	Ecological resources	86.51
	Geomorphological resources	77.02
	Cultural resources	77.30

	Mountain water	75.54
	Local culture	80.81
	Architectural style	75.51
	Concept features	78.55
	Connotative characteristics	82.48
Development characteristics	Agricultural products	77.66
	Tourism	75.57
	Image	75.34
	Animal husbandry	80.81
Number of indexes	14	
Maximum	86.51	
Maximum range of change	17.96	
The maximum magnitude of change	35.77	

The results of feature extraction in Table 7 show that the degree of features is consistent with the actual situation, indicating that broadband access, wireless Internet, wireless self-organization and IEEE 802.20 can meet the actual characteristics and conform to the basic strategies of traditional village living protection and value inheritance. The change process of the development characteristics of village diversity is shown in Figure 4.

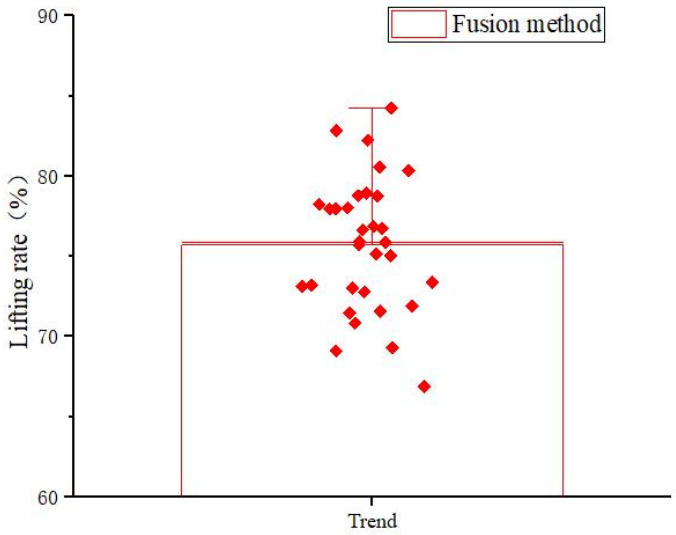

Figure 4. The Process of Living Inheritance and Value Judgment of Village Diversity

Figure 4 reveals that the approach outlined in this study is highly effective in addressing village diversity. Throughout the process of enhancing village diversity, there is a noticeable upward trajectory in the pattern of rural development and the value of heritage, accompanied by a continual growth in data.The reasons for the above problems are mainly the integration of spatial gene concepts, the simplification of village diversity data transmission, broadband access, wireless Internet, wireless self-organization and IEEE 802.20 to improve data transmission rate, reduce server occupancy and achieve diversity sustainability.

5.2 Living Inheritance Paths and Strategies for Village Diversity

The change in the living inheritance of village diversity will have an impact on production and living conditions, the protection and construction of rural environmental governance, data transmission, wireless transmission rate, and frequency band occupation, so the frequency of change should be reduced, and the specific results are shown in Table 8.

Table 8. Living Inheritance Paths of Village Diversity

Content	Legacy content	Value	Spatial genetic data	Diversity	Transfer point	Village point
Gene space	economy	77.68	78.78	80.65	76.49	74.58
Legacy space	society	77.64	76.74	73.71	74.55	75.38
Living culture	history	81.19	70.83	69.80	73.52	77.71
The value of diversity	politics	72.15	75.93	77.60	70.44	74.71

The changes in value transfer strategies in Table 8 are shown in Figure 5.

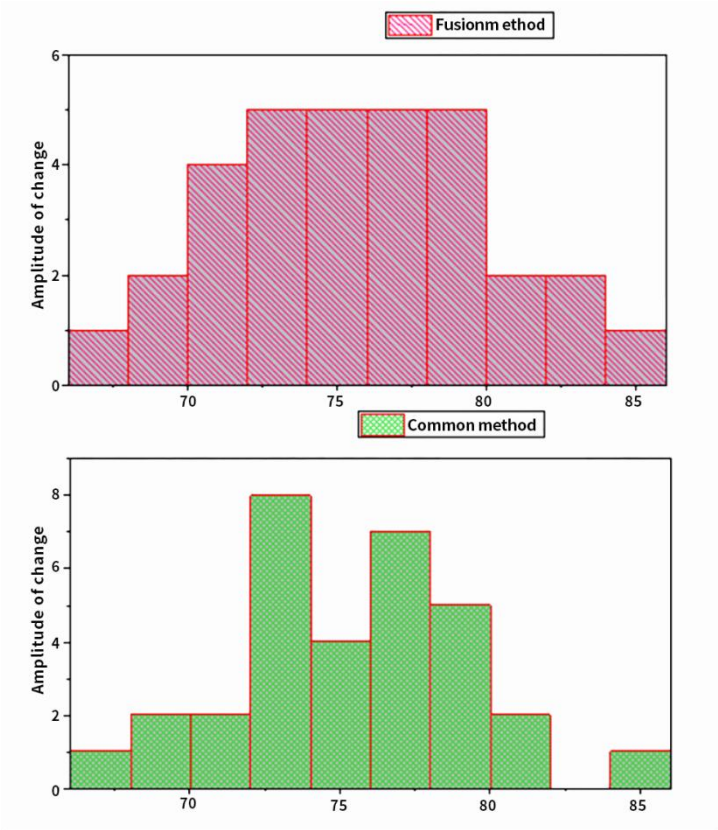

Figure 5. Changes in Value Inheritance Strategies

From the analysis presented in Figure 5, it is evident that variations in the pathways and strategies of active inheritance have a minimal effect on the approach and strategy related to village diversity. This suggests that the alterations in the living inheritance of village diversity exert a negligible influence on its heritage value. Moreover, the fundamental changes in heritage value don't impact the diversity's living heritage. This underscores the effectiveness of spatial genes in facilitating the preservation and transmission of village diversity's living heritage. The reason is that the spatial gene concept can reduce the error rate of transmission through data simplification, shorten the analysis time of village diversity living inheritance data, and increase the single data transmission volume of broadband access, wireless Internet, wireless self-organization and IEEE 802.20, which can fully meet the needs of living inheritance value analysis.

5.3 Transmission Effect of Wireless Internet

The transmission effect is essential for analyzing the characteristics of village diversity living inheritance. Implementing multi-endpoint sampling for identifying key features is crucial. This involves documenting the real-world effects of active inheritance and conducting comparative analyses. The detailed outcomes of this process are depicted in Figure 6.

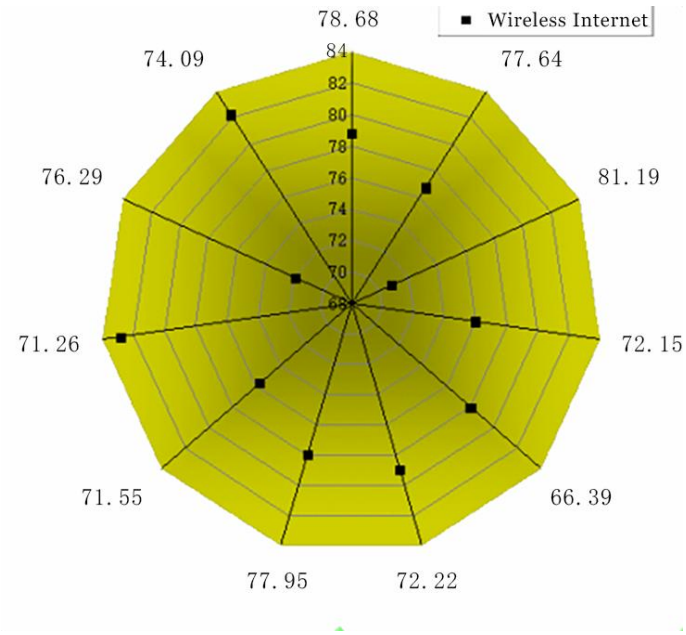

Figure 6. Broadband access, Wireless Internet, Wireless self-organization and IEEE 802.20 Transmission Effect of Village Diversity Active Inheritance

Figure 6 indicates that relay endpoints are distributed sporadically, while the data transition from a dispersed state to a more centralized one. This pattern highlights a significant disparity between relay points and feature quantities, confirming that relay endpoints are capable of meeting actual transmission demands. The data distribution across multiple points occurs due to the lack of interconnectivity among data sets, leading to data undergoing iterative changes independently, thereby facilitating enhanced iterative computations. These observations confirm the efficacy of the spatial gene concept in strategically managing the living heritage of village diversity and boosting the transmission capabilities of broadband access, wireless Internet, self-organized wireless networks, and IEEE 802.20 standards. Analyzing the data from Figure 6 leads to specific computational outcomes, which are detailed in Table 9.

Table 9. Access Point Selection Effect of Village Diversity Living Inheritance

Access point	Parameter	Access point contribution rate	Fusion effect	Convergence metrics
Random access points	Living inheritance path	75.84	72.40	8
	Succession strategies	74.20	74.58	6
	Inheriting values	82.54	84.53	12
Fixed access points	Living inheritance path	75.90	80.54	9
	Succession strategies	76.92	69.14	6
	Inheriting values	72.67	73.30	4

Identifying the data of different access points, it was found that the packet recovery rate of the rural active inheritance direction, inheritance strategy and inheritance value was greater than 84%, the receiving selection effect was 90%, and the progressive probability was greater than 70%, indicating

that the difference between the degree of village diversity active inheritance and the actual presentation results was small in different sampling results, and the selection effect and recovery rate received were greater than 84. The packet recovery rate is the fraction of packets that were successfully received over the transferred packets. It further shows that broadband access, wireless Internet, wireless self-organization and IEEE 802.20 can be realized in the real-time transmission of village diversity living inheritance data and change the increase and decrease of living inheritance data, providing wireless communication data support for village diversity living inheritance and living inheritance. Real-time data includes data transmission through wireless technologies in day-to-day life activities. This is generally envisaged by deploying sensors and other end devices.

5.4 Accuracy of Living Inheritance

The diversity of traditional village living inheritance and construction, presentation of village culture, and integration of different regional customs require high-precision network parameters. These elements are essential to judge the accurate positioning of village diversity living inheritance. The results of the above are shown in Figure 7.

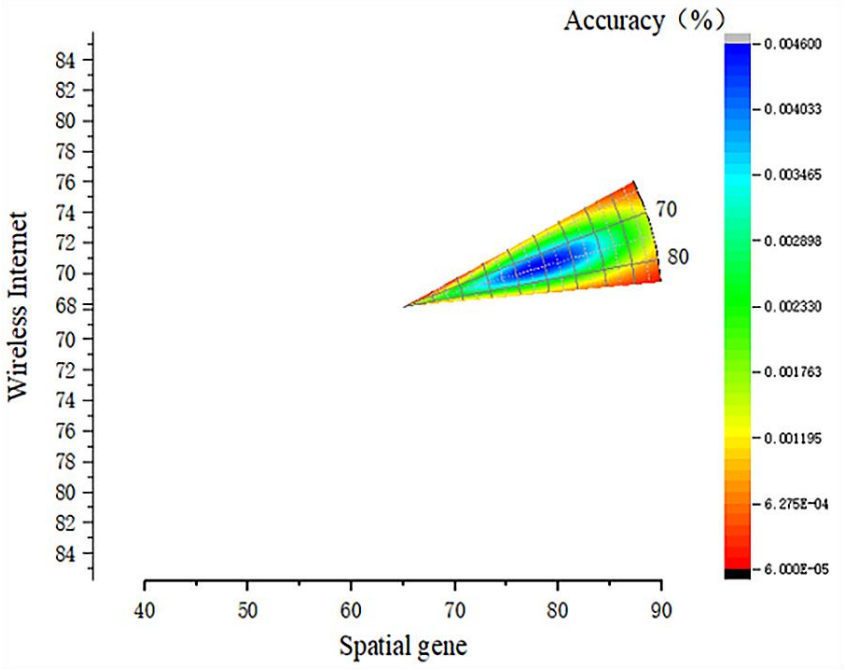

Figure. 7: Transmission Accuracy of Living Inheritance Feature Recognition of Village Diversity

Figure 7 reveals that the transmission precision of the spatial gene concept surpasses that of alternative approaches. The transmission outcomes for the living inheritance data of village diversity show minimal deviation from their actual representations. This implies that methods like broadband access, wireless Internet, self-organized wireless networks, and IEEE 802.20 transmissions can accurately perform feature extraction, thereby offering substantial support to the living inheritance of village diversity. The detailed findings of this analysis are presented in Table 10.

Table 10. Identification Accuracy of Living Inheritance Characteristics of Village Diversity

Sampled content	**Results of spatial gene processing**		**Wireless Internet transmission results**	
	Village	Space	Village	Space
Diversity	72.90	74.52	76.92	69.14
Life	78.14	70.71	72.67	73.30
Ecology	75.74	72.91	74.37	73.08
Rural culture	75.13	67.48	72.64	85.02

Spatial genes	75.53	73.91	70.50	77.62
Live	77.12	82.54	71.45	72.81
Value	78.09	82.30	66.46	71.12
Inheritance	78.48	77.88	82.39	73.95
Relevancy	73.73	80.36	73.61	64.98

An analysis of the identification process detailed in Table 10 shows that the recognition accuracy for the living inheritance of village diversity is relatively high. Furthermore, the transmission speeds achieved through broadband access, wireless Internet, self-organizing wireless networks, and IEEE 802.20 standards exceed 80%.Mainly due to the extraction of living inheritance data by the concept of spatial genes, the complexity of data in broadband access, wireless Internet, wireless self-organization and IEEE 802.20 is reduced, and it is further proved that broadband access, wireless Internet, wireless self-organization and IEEE 802.20 transmission can meet the actual requirements. Additionally, the selection process for wireless access points encountered no unusual disruptions, which suggests that the transmission of living inheritance features in village diversity was highly effective.

6. Conclusion

This paper proposes a living inheritance value extraction method based on the spatial gene concept for diversity inheritance, which uses broadband access, wireless Internet, wireless self-organization and IEEE 802.20 technology to achieve a transmission rate of 9.6Gbps. The test results show that the transmission accuracy of broadband access, wireless Internet, wireless self-organization and IEEE 802.20 technology is greater than 90%, the spatial gene concept can reasonably select wireless access points, and the transmission compliance rate reaches more than 85%, which can meet the needs of living inheritance extraction. Therefore, the organic combination of spatial gene concept with broadband access, wireless Internet, wireless self-organization and IEEE 802.20 technology can promote the living inheritance of traditional village values and sustainable living inheritance of villages. However, this work focuses on analyzing a single village's inheritance value. The conclusions drawn from the experiments may be general. As a prospect, the research can be extended to include more tangible infrastructure and cultural constructs that add more gems to the crown.

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