

Research Article

Communication Strategy of New Media Art to City Image under Smart City Information Technology

Chen Xie , Yunfeng Chen, and Qian Sun

Normal School, Hubei Polytechnic University, Huangshi, Hubei 435003, China

Correspondence should be addressed to Chen Xie; 212101@hbpu.edu.cn

Received 15 March 2022; Accepted 23 April 2022; Published 18 May 2022

Academic Editor: Zhihan Lv

Copyright © 2022 Chen Xie et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

City image, as a public image, is the public's overall evaluation and cognition of the city, including concept image, behavior image, and visual image. The new media art is an interdisciplinary research field integrating art, informatics, and communication. It emerged and developed in the new media era and effectively reached the agreement of scientific and technological means and artistic expression. This paper expounds the concept and connotation of smart city informatization and then constructs a measurement model of smart city informatization construction level based on GCD_BPNN. The degree of satisfaction of city image communication in H city was measured, the index evaluation system of system satisfaction in H city was constructed, and the comprehensive satisfaction scale of cultural system in H city was formed. The research shows that the communication of city image in the future should focus on the virtual space and construct the cultural identity and psychological identity of city image from the user's point of view.

1. Introduction

City image is the carrier of city culture, city spirit, and city development concept. People identify city image through city visual symbol, city behavior, and city decision and form the impression of city personality and characteristics [1]. In recent years, smart city has become an important concept of urban planning. By means of information technology, the city's information system is opened and integrated, forming a high-level information management framework, improving the efficiency of urban resource utilization, effectively coping with the rapid development of cities, optimizing the management and services of cities, thus improving the comprehensive competitiveness of cities, improving the quality of life of citizens, and providing new modes, new opportunities, and new ways for the sustainable development of cities [2, 3]. At present, the competition among cities has changed from pure economic competition to comprehensive competition including city image. A good city image is not only a material image, but also a spiritual image and a cultural soft power [4]. Because of this, many developed cities in the world pay great attention to image

propaganda and development and utilization of the intangible asset of city image.

New media art has produced many new artistic forms in the emotional needs of human beings. In the process of modern and contemporary artistic expression, the new media art media takes optical media and electronic media as basic languages, combining the advantages of art and technology [5]. Under the new media environment, the communication pattern is no longer limited to a single one, but a diversified and interactive communication pattern is formed by the fixed flow direction. Communication modes are more complicated and diverse, but its high-quality publicity effect is also obvious to all [6, 7]. Effective urban communication can not only enhance the charm of the city, attract tourism investment, and introduce high-end talents, but also be a key factor to enhance the competitiveness of the city. Therefore, how to shape and spread the image of the city has become a major issue faced by city managers [8]. On the other hand, for college students who are about to enter the society, the quality of a city's communication largely determines their city choice for future employment. The art under the new media technology breaks through the

multidimensional space-time limit and has multiple sensory experiences, creating an advanced model with universal significance for the city image [9]. In order to seek a higher level of the city's politics, economy, and culture, more attention should be paid to the creation of a new and unique image of the city.

New media art is based on information technology and achieves an artistic expression that integrates interactivity, experience, and real time by means of media such as sound, words, and images [10, 11]. The basic characteristics of the city are comprehensive and thorough perception of the city, ubiquitous interconnection, various intelligent fusion applications, and unified, coordinated, and sustainable development. Wisdom belongs to the new model and strategy of all-round development of urban development planning, public service, and administrative efficiency and belongs to the high-end form of urbanization [12]. If the city is regarded as a commodity, then the publicity of the city is also a process of integrated marketing. It has become a trend to spread the image of a city by means of information and data technology, and it is also an effective way to open up the channels of city promotion and continuously improve the image of a city. This paper aims to explore the effective forms of new media art's participation in urban public spaces, roads, regions, signs, and so on from the perspective of urban visual identification system and spatial environment and to interpret the significance of new media art for urban image in a diversified way so as to make it move from text to social environment and then from text to culture and society.

2. Related Work

Under the background of globalization and informatization, the informatization construction of smart cities is particularly important. Literature [13] analyzes the characteristics of smart cities, including perception, automatic response, active service, auxiliary service, and decision-making. Finally, the measures to develop smart cities are put forward from three levels, including industrial development, application innovation, and infrastructure, so as to promote the infrastructure construction of smart cities. Literature [14] analyzes and summarizes the research and literature of smart cities at present, introduces the concept of smart cities in detail, and then analyzes the development planning, guarantee, and motivation of building smart cities in China, and puts forward the development strategy of smart cities and its possible application in the future. Literature [15] studies the connotation and characteristics of smart cities, discusses the double-layer significance and important role of smart city construction at present, and discusses the deep planning and integration of cities with reference to the concept of smart planning, and how to promote the city to a better frame. Literature [16] points out that the smart city architecture system includes six levels and standards, evaluation, and security system, which provides key layout and guidance for its overall development and implementation process. Literature [17] puts forward that smart city construction is an effective way and feasible method to carry out green development in urban planning by building its comprehensive

information data processing platform and smart application foundation. It is proposed that in the process of building a smart city, top-level design should be the primary premise, overall planning should be taken into account, local characteristics of the city should be highlighted, technological innovation should be an important means, changes in market demand should be monitored, and a comfortable and green city with coordinated and unified development of natural society should be built to improve the living environment of the next generation and set an example [18].

In recent years, new media art and technology have penetrated into all aspects of social culture and life and become a new force that cannot be ignored, which plays an irreplaceable role in the image-building and publicity of countries and regions. Literature [19] expounds the origin and development of Western cities from the humanistic point of view, while Bacon associates historical examples with modern urban planning theory. These famous scholars have well described the evolution of urban form, discussed the causes of changes, and indirectly or directly proved the importance of cities. Literature [20] holds that in order to shape a successful city brand image, measures should be taken according to local conditions, proceed from reality, adhere to the principles of authenticity, identity, difference, orientation, and sustainability, and grasp the positioning strategy of city brand image. Urban construction has also been widely mentioned: urban planning cannot be separated from urban construction in the end. Literature [21] holds that new media art has gone through five stages: connection, integration, interaction, transformation, and emergence. Literature [22] holds that the history of human art development is a history of progress and evolution of media and science and technology, and the development of new media art basically changes and develops with the evolution of both. Literature [23] puts forward a new idea of urban communication. Through the concept of "communicability" and related aspects of urban life, it tries to understand and standardize the city in a more comprehensive and inclusive way so as to make it more in line with the essence of the city. Literature [24] compares cities to factories. The shaping and management of brands by cities is like the contribution of companies to their brands, which can bring considerable benefits. Literature [25] holds that the core problem of the creation of literary space in villages in cities is the transformation of one urban community culture to another, which will be simpler than the transformation of villages into cities. Literature [26] discusses the relationship between new media art and urban image from the design of urban public space: new media art undoubtedly decorates urban space, gives cities more visual beauty, and increases public participation in the form of art, bringing universal social effects.

3. Research Method

3.1. City Image and New Media Art. City is not only the product of the development of human society to a certain historical stage, but also a dynamic concept that is constantly evolving with the development of society. City image is not the terminal of urban development, but a new starting point

of future urban development. As the carrier of publicizing the city, it is very important for the city image to integrate various channels for external communication. But city image is also a double-edged sword for city development. Thus, it can be seen that a good city image is the pursuit of every city, and this expectation cannot be based on false packaging. A good city image ultimately lies in the construction of urban hardware and software facilities. Only when all aspects develop harmoniously and create a better living environment, can the reputation of the city naturally spread to the outside world.

City image is a concept that gradually emerges in people's minds in the process of urban development and evolution, and it is a manifestation of urban competitiveness. On the one hand, it is born, reflected in the objective characteristics and economic strength of the city, and on the other hand, it has gradually evolved from the word of mouth of the residents of the city. Generally speaking, excellent city image also represents strong city competitiveness and sustained high development ability.

The image of a city is not simply composed of the objective external conditions of the city but is constructed by the society. It is generated by the comparison and interaction with its internal residents and other external cities and regions. Generally speaking, the image of a city is based on the urban conditions of the objective environment, and the public has perceptual and rational knowledge of the city through various channels and can exert subjective initiative to shape the city features.

In the process of high-speed development of digital technology, it has an all-round influence on the production, dissemination, acceptance, and other nodes of new media art, especially the improvement of the iterative rate of scientific and technological level, which also keeps the new media art in a state of sustained development [5]. In the traditional media environment, the government is active and dominant. The publishers of this kind of information are the government and other administrative agencies. Compared with other information publishers, the information released by administrative agencies is more professional, accurate, and reliable. In the process of communication of this artistic expression, it can achieve efficient communication by means of TV media, online video media, peer-to-peer communication by means of interpersonal communication, and art exhibitions.

A good city image can play a positive role in local economy, politics, and culture. Under the background of new media, under the guidance of new technologies and tools, the city image communication system has become more complex and huger: first, from one-way communication to interactive communication; second, from single communication to multiple communication; and third, from mass communication to focus communication. In the traditional communication of city image in China, mass communication was emphasized.

With the continuous development of mobile Internet, the artistic expression forms of mobile media are becoming more and more abundant. Nowadays, mobile media is called the fifth media and has a very broad market prospect. From

the application of mobile media, it is mainly concentrated in mobile newspapers, mobile TV, and websites. This form of transmission is very common.

3.2. Evaluation on the Level of Smart City Informatization Construction. In the construction of a smart city, only by realizing the comprehensive coverage of the information perception network can the city obtain a large amount of information and complete the timely feedback, processing, and analysis of the information. Connecting the Internet in series into an efficient connection is the deep interconnection of networks, thus generating interactive information, finally forming an interoperable access system, and promoting the integration of information resources for users to use better.

In all the links involved in a smart city, resources need to be acquired, so the associated resources can be called or operated at any time to maximize the role of all resources. This phenomenon is defined as the coordinated sharing of resources. Smart cities are mainly embodied in the ability to process all kinds of network information in a timely and efficient manner, sort out and summarize all kinds of collected network information according to corresponding standards, maximize the use efficiency of information, reduce unnecessary waste of resources, build an intelligent, information-based and scientific network information system, and protect the network information security of cities.

The evaluation problem of informatization itself is very difficult. At the same time, due to the shortcomings of subjectivity of using expert scoring method when selecting evaluation methods with important weights, and the difficulty in controlling the number of evaluation indexes and the accuracy of index selection, it is impossible to accurately evaluate the degree of informatization construction.

By combining GCD (grey correlation degree) with BPNN (BP neural network), this paper creates a brand-new evaluation method of information construction level in smart cities—GCD _ BPNN. Through the high-performance input and output of computer language, people are greatly liberated from the complicated calculation work and then show the characteristics of good calculation accuracy, high efficiency, high classification and sorting accuracy, and so on.

According to the basic idea of GCD analysis method, what is being compared is the similarity in geometry of the curves depicted by the various sequences. Although GCD is a measure of the geometric proximity of data sequences, it generally emphasizes the relative proximity of several data sequences to a given data sequence; that is to say, the order of correlation degree should be ranked, which is the totality, which puts all factors into the system for comparison and analysis.

BPNN is the most widely used form in artificial neural network system [13]. Comprise an input layer, a hidden layer, and an output layer, and that number of each layer has no uniform standard and is usually determined according to practical problems. The formation of neurons in adjacent layers communicate with each other through the excitation

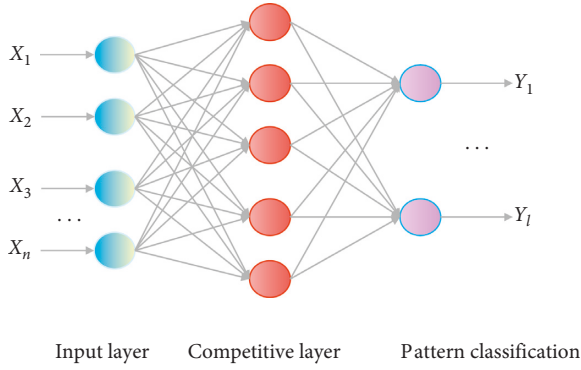


FIGURE 1: BPNN model.

function, but the nodes in each layer are not connected with each other, and their topological structure is shown in Figure 1.

GCD_BPNN learning algorithm is a combination of the advantages of GCD and BPNN, which avoids the inherent deficiencies of the two algorithms as much as possible. Using GCD theory, the GCD degree of each index is calculated to realize the reduction of the original index system, so as to eliminate redundant indexes, and the remaining index set after eliminating redundant indexes is input to BPNN for learning and training as the values of the input layer.

Assuming that GCD is σ_i , then

$$\sigma_i = \frac{1}{n} \sum_{i=1}^n r_{ij}, \quad (1)$$

where n is the number of series objects.

Mapminmax mathematical equation is used to perform dimensionless operation on input data, and the formula is as follows:

$$y_i = \frac{x_i - x_{\min}}{x_{\max} - x_{\min}}, \quad (2)$$

where x_i is the input data. x_{\max} is the maximum value in the set of x_i , and x_{\min} is the minimum value. The dimensionless data set y_i is obtained. It can be seen that the dimensionless range designed in this paper is (x_{\min}, x_{\max}) ; that is, the dimensionless processing of input values is within the range of $[0, 1]$.

Compare the training output with the predicted output of the model, and if there is any error, forward backward propagation, and correct the weight ω_i and threshold T_j . The output layer is expressed as

$$O_j(t+1) = f \left\{ \left[\sum_{i=1}^n \omega_{ij} O_i(t) - T_j \right] \right\}. \quad (3)$$

In which, T_j is the threshold of neuron; $f(\cdot)$ is the neuron transformation function; and ω_{ij} is the empirical weight value, in which ω_{ij} is calculated as follows:

$$\Delta \omega_{ij} = \eta v_i v_j. \quad (4)$$

Among them, v_i is the neuron in the upper layer of v_j , and η is the learning efficiency.

3.3. Satisfaction of City Image Communication. The connotation of urban history and culture is a stepping-stone for a city to show its own advantages. The thicker the history and culture, the stronger the humanistic value of the city. With the development of the city, the city's history and culture are constantly precipitating the essence to get rid of its dross. It is an active organism in the historical movement; just like old wine, the more it is brewed, the more mellow it is. The spirit of the city is the core of the soul, which is most directly reflected in the public cultural system of the whole city.

In the information age, the digital people's acceptance of technology is different from that of the past. Computers use the form of art to infiltrate into all levels and spaces of life, and virtual and simulation-based technologies expand the audience's visual, listening, touching, and other senses. This novel way also makes the new media art more acceptable to people in the process of shaping the city image. Generally speaking, new media art mainly acts on the public cultural service system from two aspects.

The transmission mode of spoken language has long been out of date, and the transmission of audio and television is constantly changing. The arrival of information technology not only brings changes to the whole society, but also makes the artistic development collide and merge with science and technology gradually. Nowadays, from text reading to picture reading, multimedia technology combines words, music, images, light, and shadow to create a dreamy country. In the old media era with low level of technology to today's highly developed digital space with massive information and smooth interaction, the media of art is constantly changing.

There are five stages of new media art creation: connection, integration, interaction, transformation, and emergence. It is linked and interactive. The exhibition area of the Science and Technology Museum is no exception. In addition to the exhibition hall with clear theme, there are two open laboratories and interactive areas such as dynamic cinema, which broaden the horizons. It brings people visual enjoyment and spiritual pleasure so that when the appreciator interacts with the network interactive art works, the feedback of information only occurs between the appreciator and the works, while when interacting with the multiappreciator network art works, the transmission of feedback information will constitute a complex network structure.

This paper intends to measure and evaluate the satisfaction of image communication of H city from three perspectives of tourism image culture, urban construction culture, and political propaganda culture, and nine secondary indicators of ecological culture, history culture, comprehensive display culture, life culture, traffic culture, science and technology education culture, and economic culture in three dimensions, covering three levels of cultural recognition, cultural awareness, and cultural satisfaction of each secondary indicator. The specific content is shown in Figure 2.

In this paper, the grey comprehensive evaluation method is used to measure the satisfaction of city image

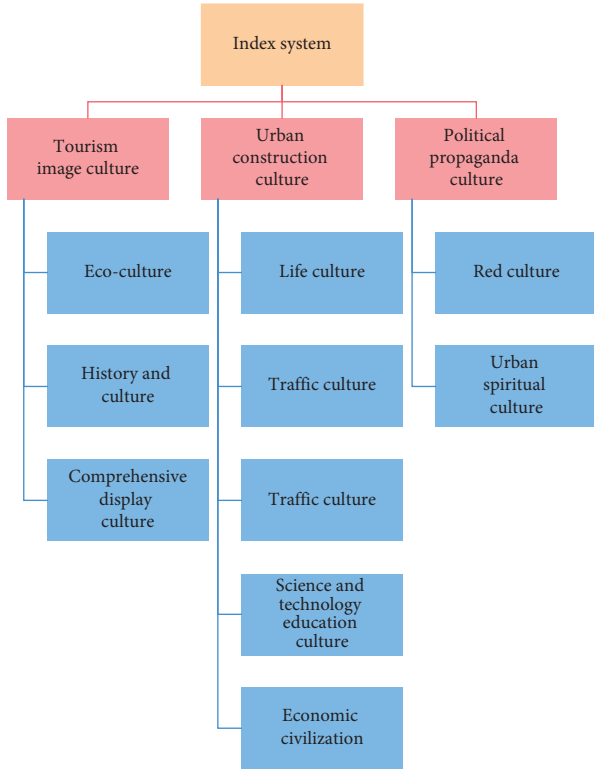


FIGURE 2: H city cultural system index system.

communication in H city. Grey comprehensive evaluation method is to measure the degree of closeness between factors according to the similarity or dissimilarity of development trends among factors, which is essentially the degree of closeness between each evaluation object and the ideal object. The closer the evaluation object and the ideal object are, the greater the degree of correlation is [20].

Form the original data matrix and determine the optimal index set:

$$D = \begin{bmatrix} i_1^2 & i_2^2 & \dots & i_n^2 \\ \dots & \dots & \dots & \dots \end{bmatrix}. \quad (5)$$

Use the correlation analysis method to find the correlation coefficient $\xi_i(k)$ between the k th index and the k th optimal index in the i th scheme; namely,

$$\xi_i(k) = \frac{\min_i \min_k |C_k - C_k^i| \rho \max_i \max_k |C_k - C_k^i|}{|C_k^* - C_k^i| + \rho \max_i \max_k |C_k^* - C_k^i|}. \quad (6)$$

According to $R = R \times W$ calculation, namely,

$$r_i = \sum_{k=1}^n \xi_i(k) \times w_k. \quad (7)$$

Among them, $i = 1, 2, \dots, m$, if r_i is the largest, it means that J^i is the closest to the optimal index; that is, the i th scheme is better than other schemes, and then all schemes can be sorted. Specific to this study, the indicators of H city's cultural system can be sorted.

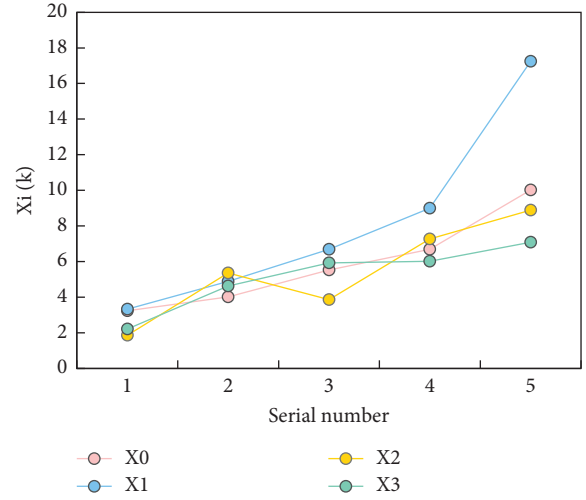


FIGURE 3: Geometric figure of sequence X_i .

4. Results Analysis and Discussion

From the above calculation results of correlation degree, we can draw the conclusion that X_0, X_1 has the highest correlation degree, so their sequence curves are the most similar, but the sequence curves of X_2 are the least similar. Therefore, this question should be considered from a continuum perspective. Moreover, this kind of calculation is based on not changing the shape of the sequence and avoids the correlation degree obtained by averaging several other kinds of correlation degrees, which are given the same weight by the correlation coefficient of each corresponding point, so the calculated result is not easy to be distorted.

Intuitively, we can see from Figure 3 below that X_2, X_0 is showing a relatively close and steady growth momentum, obviously closer than X_1, X_0 . The main reasons for the inconsistency between the calculation results and the qualitative analysis results are as follows: If the slope ratio of each corresponding period of the two X_0, X_1 sequences is a fixed constant of 21, the coefficient of variation of the slope ratio is zero, so the calculated correlation degree is 1.

The result is consistent with our conclusion of qualitative analysis of actual development situation and can reasonably reflect the positive and negative correlation, which shows that the improved calculation result is objective and reasonable. In this way, the definition of correlation degree considers the positive and negative issues of correlation degree from the overall point of view, avoiding the situation that the positive and negative offsets caused by point-by-point consideration and weighted average at last, thus reasonably solving the positive and negative issues of GCD to a certain extent.

In this paper, the training results of BPNN system constructed with different hidden layers are shown in Figure 4: iterative calculation steps, training gradient, and optimal performance.

New media art means more than just a tool and means. Its strength lies in that it first changes our lifestyle, occupies our daily visual experience, impacts our accustomed life concept, and at the same time means the establishment of a

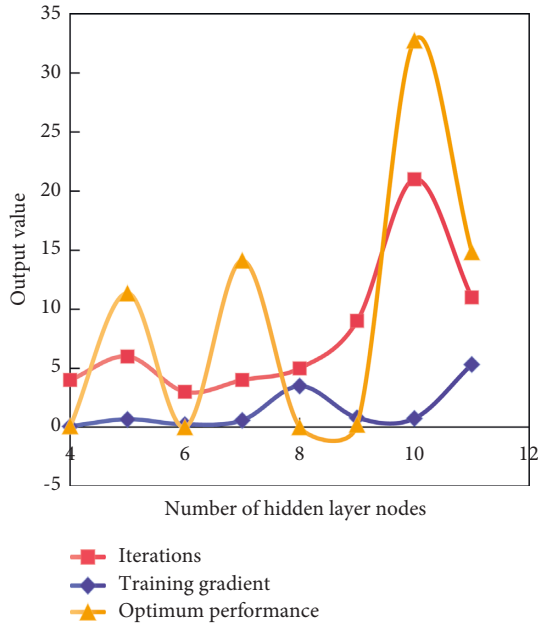


FIGURE 4: Training results of neural network system.

gradually open social and cultural common field. However, the application of new media art cannot blindly follow suit, nor can it be achieved overnight. People’s demand for artists is no longer to create moving content, but to design the environment and space so that the audience can participate in it. What artists are doing now is no longer sampling from reality to reflect their personal views, but structural framework, allowing ideas to create their own world.

According to the different values of hidden layer, the neural network includes 10 kinds of neural network structures. The simulation learning state mainly includes descending gradient and mean square error, as shown in Figure 5.

The predicted values of cities with sample numbers of 1–10 are compared with the informatization evaluation values of smart cities in the evaluation report of urban informatization index development level, as shown in Figure 6.

The government actively plays a regulatory role, actively adjusts the industrial structure, deepens the deep integration application of information technology with new information technology as the core and the tertiary industry, and constantly innovates emerging industries and develops the informatization industry and thus the informatization construction level and quality of smart cities.

Government agencies or private enterprise groups should jointly establish a comprehensive public information service management platform and use scientific and appropriate methods and means to make good use of the annual financial funds and national public resources to do their best to meet the needs of various public services such as public transportation, cultural information industry, medical community health, ecological environment, and so on. At this time, it is necessary to give full play to the active role of the public, do a good job in publicity, change the original

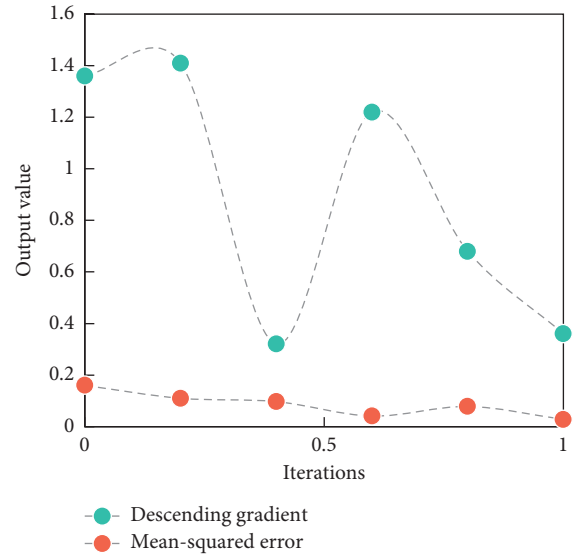


FIGURE 5: Model training state.

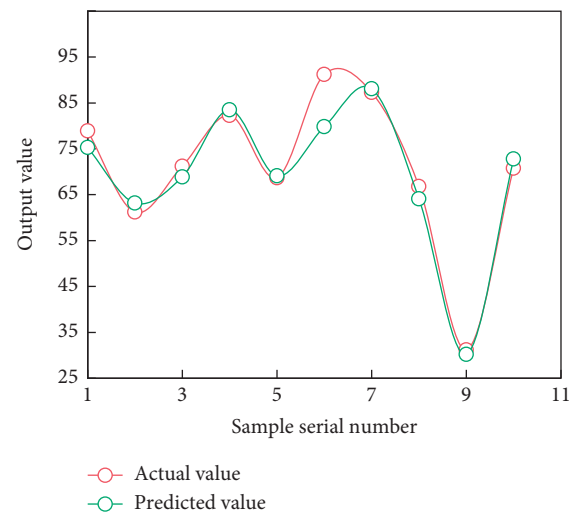


FIGURE 6: Comparison chart between predicted performance and actual performance.

thinking mode of the public, and mobilize the public to actively borrow the existing social network, portals, and other Internet information technologies to participate in the common awareness of supervising the government.

After obtaining the evaluation matrix and weight distribution vector, the comprehensive evaluation result vector of nine secondary indicators of the cultural system in H city is calculated by the formula, and the results are shown in Figure 7.

After weighting the correlation coefficients of all secondary indicators and primary indicators, they are classified into the range of 0–1. Since magnitude 1 is the correlation coefficient of perfect sequence, the larger the correlation coefficient is, the closer the score of this indicator is to the perfect sequence, that is, the higher the comprehensive satisfaction of the audience with this indicator.

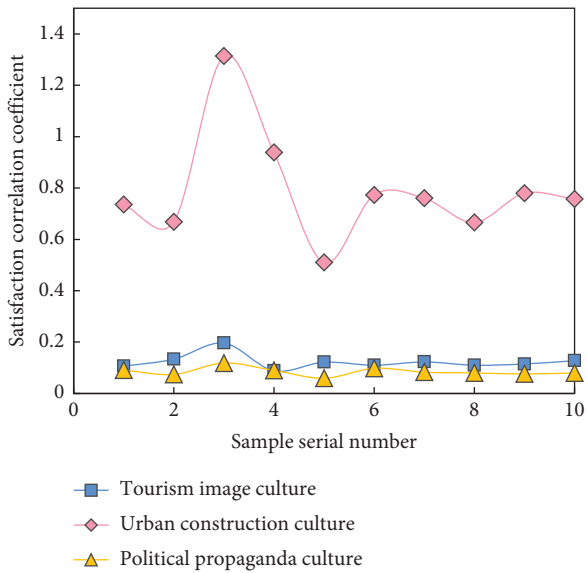


FIGURE 7: Satisfaction correlation coefficient.

From this, the comprehensive satisfaction evaluation scale of the first-level indicators of the cultural system in H city and the satisfaction evaluation scale of the second-level indicators of the cultural system in H city are obtained. The specific data are shown in Figures 8 and 9. A1~A3, respectively, represent tourism image culture, urban construction culture, and political propaganda culture; B1~B9, respectively, represent ecological culture, historical culture, comprehensive display culture, life culture, transportation culture, science and technology education culture, economic culture, red culture, and urban spiritual culture.

Overall, the comprehensive satisfaction of the cultural system in H city is better. Among them, the comprehensive satisfaction of life culture, thoroughfare culture, and comprehensive display culture in the cultural system of H city all performed well. However, the comprehensive satisfaction of science, technology, education, and culture is the lowest, and the comprehensive satisfaction of history and culture and economy and culture is relatively poor, which has become a significant shortcoming in the cultural system of H city. It reflects the difference of audience's attitude towards these indicators, among which the top four indicators are all awareness indicators about different cultural elements, which shows that different audiences have great differences in cognition of different elements of urban culture, which is also the key direction of improving the satisfaction of urban cultural system in H city in the future.

This fact must also be followed if the awareness of urban cultural carriers is to be raised. First, the relatively abstract and hard-to-solidify urban cultural elements in the urban cultural system should be materialized in various forms to increase the frequency and quality of social activities to publicize such cultures, such as the international tourism fair in H city, and so on, and strengthen the public's awareness of cultural elements with weak objectification through

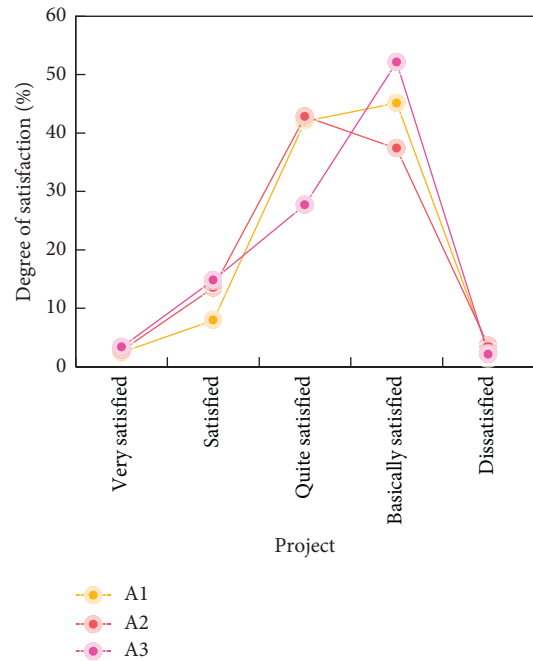


FIGURE 8: Comprehensive satisfaction evaluation of first-class index.

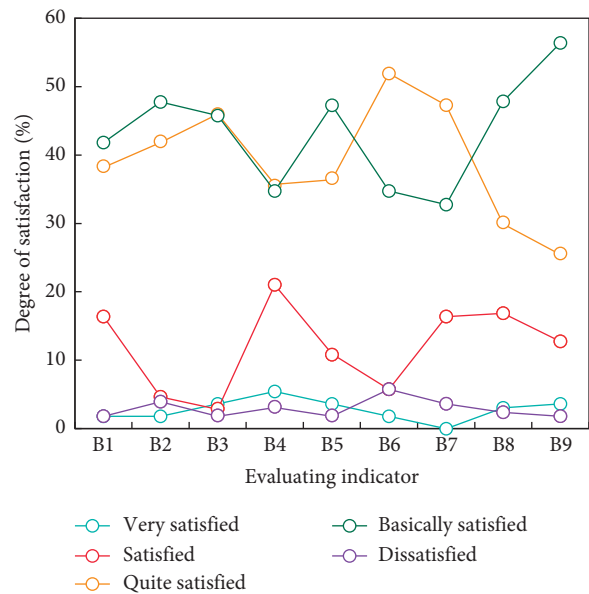


FIGURE 9: Comprehensive satisfaction evaluation of secondary indicators.

diversified publicity means. Therefore, in the future, there is still a long way to go for the cultural construction of H city, which takes the government as the leader, the citizens as the participants, and the city image communication and the city competitiveness as the ultimate goal.

5. Conclusion

In the new media era, the communication of city image needs to give full play to the communication enthusiasm of the main body of city propaganda and make it clear that the government is not the only one responsible for city propaganda, but also let public institutions, enterprises, and citizens jointly carry out communication. This paper expounds the construction basis of smart city informatization construction level measurement model and develops a smart city construction level measurement model based on GCD_BPNN. GCD algorithm is used to eliminate the indicators with poor correlation degree, and the reduced indicators are input into the measurement model of smart city informatization construction level for training. According to the network simulation results, we can innovate the smart city information infrastructure, improve the public information service quality of smart city, and optimize the smart city industrial system. The entropy weight method and grey comprehensive evaluation method are used to try to construct and evaluate the comprehensive satisfaction index system of the cultural system in H city, which provides new ideas for the future research of city image communication and city culture.

Data Availability

The figures and tables used to support the findings of this study are included in the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding the publication of this paper.

References

- [1] J. R. Santana, M. Maggio, R. Di Bernardo, P. Sotres, L. Sánchez, and L. Muñoz, "On the use of information and infrastructure technologies for the smart city research in europe: a survey," *IEICE - Transactions on Communications*, vol. E101.B, no. 1, pp. 2–15, 2018.
- [2] M. Gascó-Hernandez, "Building a smart city," *Communications of the ACM*, vol. 61, no. 4, pp. 50–57, 2018.
- [3] L. Domanic, R. Marco, V. Luca et al., "Networks for future services in a smart city: lessons learned from the connected OFCity challenge 2017," *IEEE Communications Magazine*, vol. 56, no. 8, pp. 138–144, 2018.
- [4] X. Wei, Q. Duan, and L. Zhou, "A QoE-driven tactile Internet architecture for smart city," *IEEE Network*, vol. 34, pp. 1–7, 2019.
- [5] Y. C. Hsiao, M. H. Wu, and S. C. Li, "Elevated performance of the smart city—a case study of the IoT by innovation mode," *IEEE Transactions on Engineering Management*, vol. 68, pp. 1–15, 2019.
- [6] M. Chen, X. Wei, and J. Chen, "Integration and provision for city public service in smart city cloud union: architecture and analysis," *IEEE Wireless Communications*, vol. 27, pp. 1–7, 2020.
- [7] L. Meng, P. Si, and Y. Zhang, "Delay-tolerant data traffic to software-defined vehicular networks with mobile edge computing in smart city," *IEEE Transactions on Vehicular Technology*, vol. 67, pp. 9073–9086, 2018.
- [8] H. Huang, Z. Lu, and R. Z. X. P. C. K. S.-C. Peng, "Efficiently querying large process model repositories in smart city cloud workflow systems based on quantitative ordering relations," *Information Sciences*, vol. 495, pp. 100–115, 2019.
- [9] J. Hwang, J. An, A. Aziz, and J. S. J. Kim, "Interworking models of smart city with heterogeneous Internet of things standards," *IEEE Communications Magazine*, vol. 57, no. 6, pp. 74–79, 2019.
- [10] Z. Lv, D. Chen, and J. Li, "Novel system design and implementation for the smart city vertical market," *IEEE Communications Magazine*, vol. 59, no. 4, pp. 126–131, 2021.
- [11] N. Chen, T. Qiu, L. Zhao, and X. H. Zhou, "Edge intelligent networking optimization for Internet of things in smart city," *IEEE Wireless Communications*, vol. 28, no. 2, pp. 26–31, 2021.
- [12] H. A. Khattak, H. Farman, B. Jan, and I. U. Din, "Toward integrating vehicular clouds with IoT for smart city services," *IEEE Network*, vol. 33, no. 2, pp. 65–71, 2019.
- [13] M. Chen, L. Wang, J. Chen, and X. L. Wei, "A computing and content delivery network in the smart city: scenario, framework, and analysis," *IEEE Network*, vol. 33, no. 2, pp. 89–95, 2019.
- [14] E. Woyke, "Asmarter smart city," *Technology Review*, vol. 121, no. 2, pp. 60–65, 2018.
- [15] M. Dai, Z. Su, Q. Xu, and N. Zhang, "Vehicle assisted computing offloading for unmanned aerial vehicles in smart city," *IEEE Transactions on Intelligent Transportation Systems*, vol. 22, no. 3, pp. 1932–1944, 2021.
- [16] A. Dua, N. Kumar, and A. K. Das, "Secure message communication protocol among vehicles in smart city," *IEEE Transactions on Vehicular Technology*, vol. 671 page, 2018.
- [17] Y. Yuan, P. Zhe, and B. Xiao, "Parallel hyper-heuristic algorithm for multi-objective route planning in a smart city," *IEEE Transactions on Vehicular Technology*, vol. 671 page, 2018.
- [18] D. Fischer, F. Kaufmann, O. Selinger-Lutz, and C. Voglstätter, "Power-to-gas in a smart city context - influence of network restrictions and possible solutions using on-site storage and model predictive controls," *International Journal of Hydrogen Energy*, vol. 43, no. 20, pp. 9483–9494, 2018.
- [19] A. Colmenar-Santos, E.-L. Molina-Ibáñez, E. Rosales-Asensio, and Á. López-Rey, "Technical approach for the inclusion of superconducting magnetic energy storage in a smart city," *Energy*, vol. 158, no. SEP.1, pp. 1080–1091, 2018.
- [20] Z. Tang, K. Jayakar, X. Feng, and H. R. X. Zhang, "Identifying smart city archetypes from the bottom up: a content analysis of municipal plans," *Telecommunications Policy*, vol. 43, no. 10, Article ID 101834, 2019.
- [21] A. Tascikaraoglu, "Evaluation of spatio-temporal forecasting methods in various smart city applications," *Renewable and Sustainable Energy Reviews*, vol. 82, no. 1, pp. 424–435, 2018.
- [22] H. Kim, L. Mokdad, and J. Ben-Othman, "Designing UAV surveillance frameworks for smart city and extensive ocean with differential perspectives," *IEEE Communications Magazine*, vol. 56, no. 4, pp. 98–104, 2018.
- [23] Y. Hui, Z. Su, and T. H. Luan, "Unmanned era: a service response framework in smart city," *IEEE Transactions on Intelligent Transportation Systems*, vol. 37, pp. 1–15, 2021.
- [24] D. L. Ferreira, B. Nunes, C. Campos, and K. Obraczka, "User community identification through fine-grained mobility

- records for smart city applications,” *IEEE Transactions on Intelligent Transportation Systems*, vol. 23, pp. 1–15, 2020.
- [25] Q. Liu, H. Xue, S. Zhou, and H. Wang, “Evaluation of the synergy level between water environment and urban development for the new smart city: a case study of guangzhou,” *Journal of Coastal Research*, vol. 115, no. sp1, p. 543, 2020.
- [26] A. Gosavi, G. Fraioli, L. H. Sneed, and N. Tasker, “Discrete-event-based simulation model for performance evaluation of post-earthquake restoration in a smart city,” *IEEE Transactions on Engineering Management*, vol. 67, no. 3, pp. 582–592, 2020.