A Study of Folk Aesthetic Culture of Minnan Ancestral Hall in the Context of Big Data and Artificial Intelligence

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Abstract: - In the past, people with the same family name gathered in a region were made into a family, and each family had its family temple for worshipping ancestors and remembering their forefathers, and such family temples with special significance were called ancestral halls. The southern Min region has experienced more hardships compared to the northern region, so it pays more attention to the family and places an important place on the transmission of blood ties. The values of people are subtly changed in this environment, and through the inculcation of generations, the people of southern Fujian internalized the values inherited from this architecture of ancestral halls into their aesthetic consciousness. The purpose of this study is to explore the impact of technological development on the evolution of regional aesthetic characteristics in the context of Big data and Artificial intelligence, starting from the folk aesthetic culture of Minnan ancestral halls. The architecture of Minnan ancestral halls is characterized by the adaptation of ancestral hall architecture to the climate of Southern Fujian, the unique architectural framework of ancestral halls, the use of vibrant colors in Minnan ancestral halls, and the Minnan ancestral halls. The art of stone carving and aesthetic literacy are two major aesthetic features of Minnan's ancestral halls. The number of Minnan ancestral halls is huge, and to analyze their aesthetic characteristics it is necessary to use the ability of Big data storage to analyze massive data and to extract some representative ancestral hall buildings from the database of Minnan ancestral halls for analysis. The various aesthetic features of the database are clustered and analyzed through Big data analysis technology to summarize the representative aesthetic features of Minnan ancestral halls. At the same time, some people in the Minnan area were selected as the research subjects, and the data related to the folk aesthetic consciousness of the people were obtained using a questionnaire survey, and then the "aesthetic elements" and "aesthetic consciousness" were input into the artificial intelligence training model by combining Big data and Artificial intelligence technology. The relationship between elements is explored through artificial intelligence decision-making. Finally, this conclusion is illustrated in four dimensions. From the dimension of color, the residents of Minnan mostly use relatively bright colors to decorate their houses, which is consistent with the use of red and black colors in Minnan's ancestral halls. In terms of shape, the architectural style of Minnan ancestral halls also influenced the development of later buildings, some of which evolved from Minnan ancestral halls as prototypes. In terms of materials, the Minnan ancestral halls were built with a combination of wood and stone, while later generations only increased the proportion of stone. In terms of culture, the development of folk aesthetic consciousness is echoed by the core values of blood and clan ties transmitted by the Minnan ancestral halls left.

Key-Words: - Big data, Internet of things, Minnan ancestral halls, folk aesthetic culture

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1 Introduction

With the advent of the information age, the development of industrial technology has created a large amount of semi-structured and unstructured data, causing a dramatic increase in the scale of data, thus entering the era of Big data. The era of Big data has made people realize the preciousness of data, and how to excavate useful information from the massive data

has become an urgent problem to be solved. Artificial intelligence technology is developed based on computer science theory, and it is widely used to simulate the human perspective well to solve some problems in production practice. Artificial intelligence technology can realize the use of human-like learning, thinking, and knowledge-seeking abilities to continuously expand its knowledge base, and eventually be able to solve some problems that human beings cannot solve. The application model of Big data and AI in various industries is shown in Figure 1. For example, data is acquired and a model is set to optimize the knowledge base of AI and improve the learning ability. If a specific problem is required to be solved, certain parameters should be set in conjunction with the problem itself for the final solution, [1], [2].

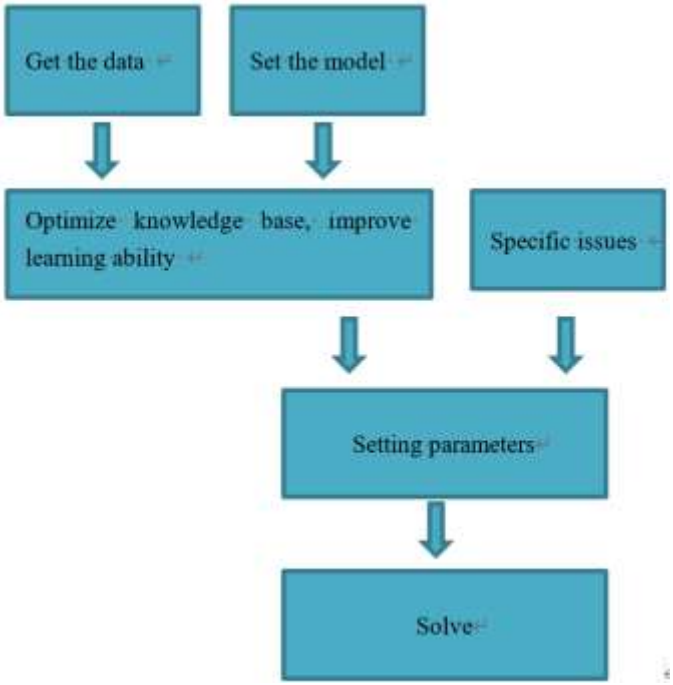

Fig. 1: Application model of artificial intelligence and Big data

During the feudal period, great importance was attached to the respect of elders and children, family concepts, and blood relations. In the past, people with the same family name gathered in an area were made into a family, and each family had its family temple for worshipping ancestors and remembering their forefathers, and such family temples with special significance were called ancestral halls. Southern Fujian is one of the regions with the largest number of temples and ancestral halls in China. Because of its special geographical location, the ancestral halls in southern Fujian have been preserved. As there are many mountains in southern Fujian, the ancestral halls are integrated with the mountainous terrain with the help of the mountains and rivers, which protect the ancestral halls in southern Fujian to a certain extent. So, the ancestral halls in southern Fujian echo the traditional Chinese architectural aesthetics. The architecture of ancestral halls in the southern Fujian region takes the wooden frame as the central structure of ancestral halls, and the arrangement of the main structures strictly follows the characteristics of symmetry, balance, and coordination of proportions. They abandoned the traditional concept of using the external majestic building as a symbol of the ancestral hall and adopted the idea of turning spatial culture into temporal culture, building courtyards in single rooms and thus constructing a large number of building groups, forming an uneven, high-low architectural plane. Most of the ancestral hall buildings in southern Fujian are dominated by gold, supplemented by exquisite carvings, wood carvings, and glazed carvings, which constitute a magnificent architectural scene, [3], [4].

There are two major influences on folk aesthetic consciousness. One is the life of the folk, and the other is the folk shape. In the early days, due to strong religious beliefs, ancestral halls were one of the places of popular activities, and the various architectural shapes of ancestral halls also left a deep impression on the people and influenced the development of their aesthetic consciousness. In the process of historical iteration and development, the formation of folk aesthetic consciousness is influenced by a variety of factors, but due to the stability and inheritance of the development of folk aesthetic art. Nowadays, a stable development pattern of folk aesthetic consciousness has been formed. Various kinds of folk art also follow the development law of folk aesthetic consciousness, and likewise, the development of folk aesthetic art is also influenced by various kinds of folk art. The difference between folk aesthetic consciousness and universal aesthetic consciousness lies in the slowness, historical inheritance, and stability of the formation process, while folk aesthetic consciousness mostly comes from folk production practices and has traceability, [5].

The differences between the article and the existing literature are as follows: (1) From the perspective of folk aesthetic culture, this paper makes an in-depth

analysis of the aesthetic characteristics of ancestral temple architecture in southern Fujian, while the existing literature pays more attention to the history, society, religion and other aspects of ancestral temple architecture in southern Fujian. (2) This paper uses big data and artificial intelligence technology to cluster the database of ancestral temple buildings in southern Fujian, extracts representative aesthetic features, and explores the relationship between aesthetic elements and aesthetic consciousness through an artificial intelligence decision-making model. This is an innovative research method, and the existing literature uses more traditional literature review, case analysis, questionnaire survey, and other methods.

2 Review of Research

2.1 Architectural Characteristics of Ancestral Halls in Southern Fujian

2.1.1 Ancestral Hall Architecture Adapts to the Climate of Southern Fujian

The southern Fujian region has a subtropical marine climate, with high temperature and humidity throughout the year, high air humidity, and is located on the coast and often receives typhoon disturbances. To avoid building decay and to achieve the effect of ventilation and moisture prevention, the ancestral halls in southern Fujian adopt a “square and whole” layout, so that the small doors in the two compartments can be ventilated, as well as the halls in the front and rear directions. This layout can provide a good ventilation environment for the ancestral halls in southern Fujian and ensure the service life of the buildings, [6], [7].

2.1.2 Ancestral Halls have a Unique Architectural Framework

The house frame in southern Fujian can be divided into two types, one is the inserted-beam sitting-beam frame and the other is the pierced-drawer frame. The former applies to temples and ancestral halls, while the latter applies to daily dwellings, etc. Ancestral halls are areas where people worship incense, so the former is generally used to avoid accidents such as fires, while Minnan ancestral halls are built with the sitting beam frame because of its aesthetic elements. The sitting-beam construction can make a sense of unevenness, [8], [9].

This paper introduces the history, function, structure, form, color, and other characteristics of ancestral temple architecture in southern Fujian and their influence on the culture and values of the people in southern Fujian. The article believes that the ancestral temple building in southern Fujian is the most perfect ancient building in southern Fujian, and it is also an important carrier of traditional culture. Each ancestral temple is a microcosm of the history of a family, recording the family's inheritance, rise and fall, origin, and other stories, [10]. This paper analyzes the two types of earth buildings in southern Fujian and Hakka earth buildings and compares and distinguishes them from the aspects of function, type, and structure. The article points out that Minnan Tulou and Hakka Tulou are collective houses built with rammed earth and wood, but there are obvious differences in shape, scale, layout, and decoration. The article also discusses the protection and restoration of earth buildings, [11]. This paper introduces the characteristics and style of Minnan Tulou buildings, as well as their status and value in Chinese rural architecture. The article believes that the earth building in southern Fujian is a unique rammed earth building with a strong defensive and collective nature. The article also shows some exquisite photos of Minnan Tulou buildings, [12], [13].

2.2 Aesthetic Elements of Minnan Ancestral Hall

2.2.1 Stone Carving Art

Due to the hot and humid climate in southern Fujian, wooden building materials tend to decay easily, with short service life and high subsequent maintenance costs, therefore, in the later period, the construction of the main components of ancestral halls in southern Fujian mostly adopts stone construction, and today, the art of stone carving in ancestral halls has become an aesthetic element of ancestral halls in southern Fujian. Most of the supporting parts of the ancestral halls, such as the frame beams, foyers, and pedestals, are built with stone construction, supplemented by exquisite stone carvings. The skills of stone carving were also gradually improved, with relief carving and flat carving appearing in the Qing Dynasty, and in the Republican period, hollow carving also gradually matured, and the carving skills became more and more exquisite. The towering architecture is complemented by delicate stone carvings that add to the exquisiteness of the ancestral hall architecture. The most common

style of stone carving today is lapidary relief, which is mostly found on the outer walls of ancestral halls and is usually covered with lapidary reliefs, giving a sense of majesty and grandeur, [14].

2.2.2 Cultural Literacy

The ancestral hall records the prosperity and development of a family and is a building with monumental and inherited significance. Ancestral halls hold the sentiment of thoughts, and they are often built by villagers on their initiative because they are a remembrance of their ancestors, at the same time, they allow wanderers in foreign countries to remember their ancestors and hold the pain of homesickness. Ancestral halls are also the prosperity and development of a family. Ancestral halls arrange the ancestors in the family according to the traditional Chinese order of eldest and youngest, and branch the ancestral halls according to the proximity of blood, and eldest and youngest respect and blood relationships are the core of the culture of ancestral halls. The reason for the construction of ancestral halls is to remember the ancestors, so they symbolize solemnity and silence and represent the memory of the ancestors. Most of the architectural styles of ancestral halls are also majestic and solemn. "Filial piety is an excellent virtue promoted by the Chinese people. Every child is taught from childhood to respect his or her teachers, and the shrine is also a form of filial piety.

3 Research on the Influence Mechanism of Folk Aesthetic Consciousness of Minnan Ancestral Halls in the Context of Big Data and Artificial Intelligence

3.1 Research Ideas

The number of Minnan ancestral halls is huge, and to analyze their aesthetic characteristics, it is necessary to use the ability of Big data to store and analyze a large amount of data and to extract some representative ancestral hall buildings from the database of Minnan ancestral halls for analysis. The various aesthetic features of the database are clustered and analyzed through Big data analysis technology to summarize the representative aesthetic features of Minnan ancestral halls. At the same time, some people in the Minnan area were selected as the research subjects, and the data related to the folk aesthetic consciousness of the people were obtained by means of questionnaire survey, and then the "aesthetic elements" and "aesthetic consciousness" were input into the artificial intelligence training model by combining Big data and artificial intelligence technology. The relationship between the two elements is explored through artificial intelligence decision-making, [15].

3.2 Technical Support

Big data has high data complexity, high data dimensionality, and high data diversity. Big data analysis can analyze massive data and deal with complex data. The object of the paper, Minnan Ancestral Hall, is difficult to deal with according to traditional analysis because of the huge quantity and high dimensionality, but Big data can solve this aspect of the problem. The data processing capability and data analysis capability of Big data can collect all kinds of information about Minnan ancestral halls, optimize the data, and select the appropriate data for this study.

3.3 Research on the Influence Mechanism

3.3.1 Model Construction

Firstly, a questionnaire survey was conducted among 1000 people in the Minnan area to obtain data about people's culture of folk aesthetics. The main contents of the questionnaire survey are shown in Table 1, [16], [17].

Table 1. Questionnaire survey

Project	Content
Aesthetic feeling	What items can produce beauty?
	Source of beauty
	The pleasure of beauty
Aesthetic orientation	Feelings of beauty as a whole
Aesthetic value	What is beauty?
Aesthetic concept	What aesthetic elements are the embodiment of beauty
Aesthetic experience	Preference for the whole of beauty
	Frequently seen aesthetic elements

To ensure the reliability of the questionnaire, the researchers conducted a reliability analysis and validity analysis of the questionnaire. Section 3.3 introduces the reliability and validity analysis methods and results of the questionnaire survey.

The validity analysis of the data of the

questionnaire is an important guarantee of the reliability of the questionnaire results. There is Table 2 shows that the KMO value of the validity analysis is 0.736, and according to the judgment standard of the validity analysis, it is known that when the coefficient of validity analysis > 0.06, the data of this experiment is considered to have good reliability.

In this project, factor analysis was performed on 16 original variables, and four common factors were extracted, named Factor 1, Factor 2, Factor 3, and Factor 4. Before rotation, the eigenvalues of these four factors are 3.196,1.287,2.898 and 2.999, respectively, indicating that the first factor contains the most information and the second factor contains the least information. The variance interpretation rates of these four factors are 19.62 %, 9.64 %, 10.90 %, and 8.97 %, respectively, indicating that the first factor can explain 19.62 % of the variance of the original variable, the second factor can explain 9.64 % of the variance of the original variable, and so on.

Table 2. Validity analysis

Project	Factor 1	Factor 2	Factor 3	Factor 4
Eigenvalues (before rotation)	3.196	1.287	2.898	2.999
Variance explanation rate (before rotation)	19.62%	9.64%	10.90%	8.97%
Cumulative variance interpretation rate (before rotation)	16.61%	88.24%	67.13%	47.08%
Eigenvalues (after rotation)	3.88	1.35	4.26	2.15
Variance explained rate % (after rotation)	86.89%	66.68%	69.22%	69.55%
Cumulative variance explained rate % (after rotation)	77.67%	76.63%	79.99%	88.55%
Kmo value	0.736			
Barth's spherical value	0			
Df	66			

The cumulative variance interpretation rates of these four factors are 16.61 %, 88.24 %, 67.13 %, and 47.08 %, respectively, indicating that the first four factors can explain 47.08 % of the variance of the original variable. After rotation, the eigenvalues of these four factors are 3.88,1.35,4.26, and 2.15, respectively, indicating that the third factor contains the most information and the second factor contains the least information. The variance interpretation rates of these four factors were 86.89, respectively.

An important criterion of reliability analysis to test the credibility of the questionnaire survey is when the reliability result is between 0.8 and 1, which means that the questionnaire has good credibility. As shown in Table 3, the reliability coefficient of this experiment is 0.802, which is between 0.8 and 1 and has a high reliability. From Table 2, it can be seen that after rotation processing, both the eigenvalue, difference interpretation rate and cumulative variance interpretation rate showed a high degree of optimization, proving the good effectiveness of the calculation in this experiment.

Table 3. Reliability analysis

Sample size	Number of projects	Cronbach.α coefficient
200	10	0.802

The content of the survey mainly involves the perception of beauty, the concept of beauty, the orientation of beauty, the experience of beauty, etc. Through these contents, we can roughly reflect the aesthetic consciousness of the people in Minnan. The questionnaire data obtained from 1000 respondents through questionnaire survey are as follows.

Table 4. Aesthetic culture of Minnan residents

Variable	Total score	The average score of a single question
Perception of beauty	78.55	3.91
Aesthetic orientation	74.31	3.08
Aesthetic experience	70.21	4.02
Aesthetic concept	71.25	3.93

The questionnaire survey is designed with 20 questions on aesthetic feeling, aesthetic orientation,

aesthetic experience, and aesthetic concept, each with 5 points, and the scores of Minnan are shown in Table 4, in which aesthetic feeling has the highest score, but overall the scores of the four items are not very high, and there is still much room for improvement.

Secondly, we extracted the data from the information database of Minnan Ancestral Hall through Big data and artificial intelligence technology. The data in the information database involved several dimensions, and we analyzed the data of Minnan Ancestral Hall in the database through Big data and artificial intelligence technology and conducted cluster analysis to select representative dimensions for the next experiment. As the data for the experimental investigation. The first category is the color dimension, this part of the data is the color parameters and materials used in various parts of Minnan architecture including the main building and the small decorations. The second part is the material dimension, which is the material used in each part of Minnan architecture, including the main structures and small ornaments. The third part is the shape dimension, which is the shape of each part of Minnan architecture, including the main structures and small ornaments, and this study studies the shape from a three-dimensional perspective. The fourth part is the cultural dimension, including the cultural connotation represented by each part of the Minnan ancestral hall including the extremely decorative items. Through the analysis and decision-making ability of Big data and artificial intelligence, we initially screened out several representative dimensions. I use data mining technology to analyze the factors that affect the characteristics of temples in southern Fujian. Firstly, I collected temple data in southern Fujian, including architectural style, sacrificial objects, historical evolution, geographical location, and so on. Then, I used clustering analysis, decision trees, association rules, and other methods to classify, summarize, and mine the data. Then, four main factors affecting the ancestral temples in southern Fujian were found, as shown in Figure 2.

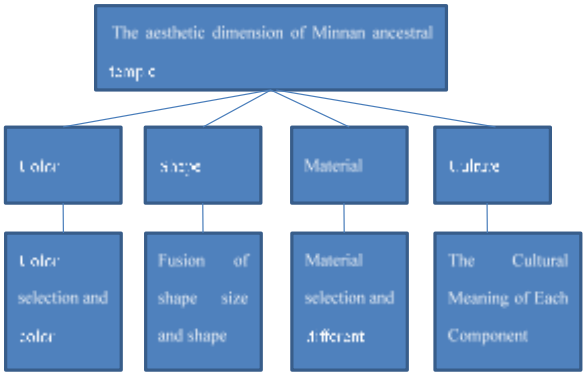

Fig. 2: Aesthetic dimensions of Minnan Ancestral Hall

The model is constructed using Big data and artificial intelligence-related technologies, and its core steps are divided into the following five steps.

Key step 1: The two formulas in equation a1 are the data from the questionnaire survey on the aesthetic culture of Minnan residents and the standardization of the four dimensions of data derived from the cluster analysis of, respectively, the data related to Minnan ancestral halls.

$$\begin{cases} P_{sc2}(t) = P_{sc}(t) + \Delta P_{sc}(t) - \Delta y_{sc}(t)\Delta P_b(t) \\ P_{b2}(t) = P_b(t) + \Delta P_b(t) - \Delta y_b(t)\Delta P_{sc}(t) \end{cases} \quad (1)$$

Key step 2: Equation (2) is a summary operation of the normalized results in Equation (1).

$$P_{L,total}(t) = P_w(t) + P_v(t) + P_{tr}(t) - P_{sc2}(t) - P_{b2}(t) \quad (2)$$

Key step 3: Equation (3) is a weighted calculation of the results of different dimensions derived from the operation of Equation (2).

$$P(p) = C(p) \cdot D(p) \quad (3)$$

Key Step 4: Equation (4) is to filter the data and remove the data that do not meet the requirements according to the operation result of formula c1 for further operation.

$$C(p) = \frac{\sum_{q \in \psi_p \mathrm{I}\, (I \setminus \Omega)} C(q)}{|\psi_p|}, D(p) = = \frac{|\nabla \boldsymbol{I}_p^{\perp} \cdot n_p|}{\alpha} \quad (4)$$

Key step 5: Equations (5)-(8) are the core steps of analysis and decision-making.

$$G_1(S) = \frac{C_1(S)}{R_1(S)} \quad (5)$$

$$G(S) = G_1(S) + G_2(S) = K_1 Tin(S) + \frac{K_2 Lout(S)}{1 + Tout(S) \cdot Lout(S)} \quad (6)$$

$$K_1 = D \cdot P \cdot L \cdot \frac{St - E \cdot Test}{T}, K_2 = \frac{1 + E \cdot Test - Item \cdot D}{St \cdot Lin} + D \cdot L \quad (7)$$

$$G(S) = \frac{K_1 K_2}{K_1 S^3 + K_2 S^2 + S + 1} \quad (8)$$

We got the data related to the aesthetic consciousness of Minnan residents and the aesthetic dimensions of Minnan ancestral halls obtained from the questionnaire survey, and we used the obtained data to make relevant analyses and decisions using Big data and artificial intelligence technology. We found that what temperature of Minnan ancestral halls affects the folk aesthetic consciousness of Minnan residents in different aspects. In terms of the dimension of color, Minnan residents tend to use relatively bright colors to decorate their houses, which is consistent with the fact that Minnan's ancestral halls tend to use colors such as red and black. In terms of shape, the architectural style of Minnan ancestral halls also influenced the development of later buildings, and some later buildings evolved from Minnan ancestral halls as prototypes. In terms of materials, the Minnan ancestral halls were built with a combination of wood and stone, while later generations only increased the proportion of stone. From the perspective of culture, the development of folk aesthetic consciousness is echoed by the core values of blood and clan ties transmitted by the Minnan ancestral halls left, [17], [18], [19].

3.3.2 Model Significance

The aesthetic dimensions of Minnan ancestral halls in this study and the relevant data derived from the questionnaire survey were planned and analyzed according to artificial intelligence and Big data analysis techniques. The selection of the model will greatly affect the magnitude of changes in the research data. To choose the optimal calculation model, researchers randomly selected a portion of the data and conducted simulation calculations on several classic models such as Turing, von Neumann, data flow, and application. Then, the results were compared, and the calculation model in the article was ultimately selected.

3.3.3 Technical Value

Vigorously promoting the development of national aesthetic culture has been an important measure for China to implement cultural strategies in recent years. It has a very important impact on promoting national confidence and even spreading Chinese culture, and many outstanding research results have emerged recently. Compared with these research results, the main characteristics of this article are reflected in the following aspects. Firstly, the selected entry point is more specific, taking the folk aesthetic and cultural characteristics of Minnan ancestral halls as the research object, taking into account the combination of national aesthetics and regional characteristics. Secondly, the selected model is more optimized. In the process of selecting the model, this study not only fully draws on the advantages of existing research results, but we also used a comparative calculation method to select a calculation model that is more suitable for this study. This enables this study to better reflect the evolution of cultural aesthetic characteristics in the context of Big data and artificial intelligence.

4 The Influence of Minnan Ancestral Halls on Folk Aesthetics

The influence of Minnan's ancestral halls on folk aesthetics can be elaborated in three aspects: the influence of architectural style, humanistic sentiment, and aesthetic interest. Specifically, it is shown in Figure 3.

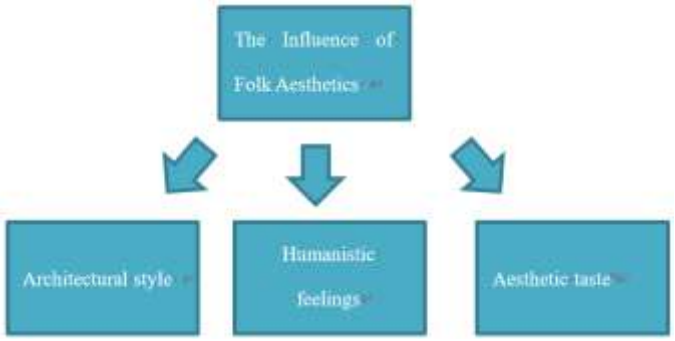

Fig. 3: The influence of Minnan ancestral halls on folk aesthetics

4.1 Minnan Ancestral Halls have Influenced the Architectural Aesthetics of the Minnan Region

Architectural aesthetics is a region's experience of the overall construction of a building and the shape and color matching of each component of a building after a long period of time and is influenced by many factors. Architectural aesthetics is influenced by many factors,

such as personal emotions, religious beliefs, and cultural heritage, which are all important factors affecting architectural aesthetics. After the above research, we found that the aesthetic characteristics embodied in the architecture of Minnan ancestral halls are an important part of the aesthetic consciousness of Minnan residents. The aesthetic characteristics of architecture embodied in Minnan ancestral halls influence the development of Minnan residents' aesthetic consciousness from several angles, and the specific proportion of their influence is shown in Figure 4. From Figure 4, it can be seen that the architectural characteristics of Minnan ancestral halls influence aesthetic consciousness in many ways, specifically, the proportion of influence of architectural shape is the largest, followed by cultural connotation. However, this experiment only selected dimensions such as size, color, shape, material, and culture for the study, ignoring some factors that have a smaller proportion of influence, [20], [21].

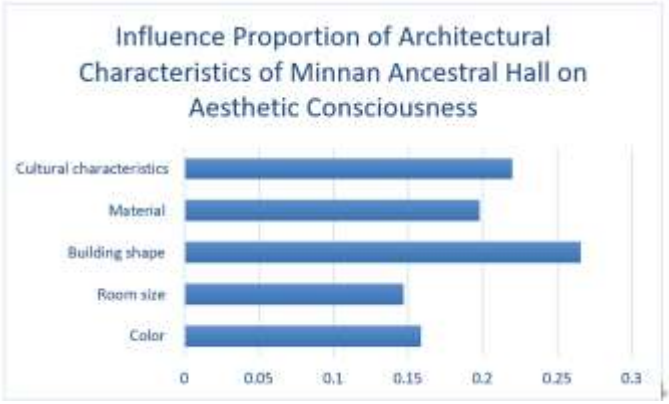

Fig. 4: Proportion of the architectural characteristics of Minnan ancestral halls influencing aesthetic consciousness

4.2 Minnan Ancestral Halls Influenced the Humanistic Sentiment of the Minnan Region

Through the analysis and decision-making ability of Big data and artificial intelligence, we initially screened out several representative dimensions. Since ancient times, the Minnan region has been plagued by many disasters, and some of the wanderers in Minnan are often homeless, so to remember their ancestors and express their feelings of longing for their relatives, they intelligently do so by building ancestral halls. In later generations, ancestral halls then formed a relationship with blood relations and family as the core. Ancestral halls enshrine the rows of ancestors and are a very important part of a family's heritage, recording the prosperity and flourishing of a family, [22].

4.3 Minnan Ancestral Halls have Influenced the Aesthetic Sensibility of the Minnan Region

The Minnan ancestral halls are one of the important buildings in the Minnan region. In successive generations, the Minnan people have had a more solemn love for the ancestral halls, and the ancestral halls have become an essential part of the Minnan people's life, which has changed the Minnan people's life interests subtly and influenced the Minnan people's living habits and aesthetic interests, becoming the Minnan people's aesthetic interests flowing in their blood and engraved in their bones, [23], [24].

5 Conclusion

Big data and artificial intelligence technologies have been developed to date and have been widely used in various fields. Big data and artificial intelligence technologies are key technologies for scientific analysis, statistical planning, and problem-solving, and are widely used in finance, economy, education, and culture. Big data and artificial intelligence technologies also have an important role in the study of the folk aesthetic consciousness of Minnan's ancestral halls. During the feudal period, great importance was attached to the respect of elders and children, family concepts, and blood relations. In the past, people with the same family name gathered in an area were made into a family, and each family had its family temple for worshipping ancestors and remembering forefathers, and such family temples with special significance were called ancestral halls. The southern Min region has experienced more hardships compared to the northern region, so it pays more attention to the family and places an important place on the transmission of blood ties. The values of people are subtly changed in this environment, and through the inculcation of generations, the people of southern Fujian internalized the values inherited from this architecture of ancestral halls into their aesthetic consciousness.

The number of Minnan ancestral halls is huge, and to analyze their aesthetic characteristics it is necessary to use the ability of Big data storage to analyze massive data and to extract some representative ancestral hall buildings from the database of Minnan ancestral halls

for analysis. The various aesthetic features of the database are clustered and analyzed through Big data analysis technology to summarize the representative aesthetic features of Minnan ancestral halls. At the same time, some people in the Minnan area were selected as the research subjects, and the data related to the folk aesthetic consciousness of the people were obtained by means of questionnaire survey, and then the "aesthetic elements" and "aesthetic consciousness" were input into the artificial intelligence training model by combining Big data and Artificial intelligence technology. The relationship between the two elements is explored through artificial intelligence decision-making. Finally, this conclusion is illustrated in four dimensions. From the dimension of color, the residents of Minnan mostly use relatively bright colors to decorate their houses, which is consistent with the use of red and black colors in Minnan's ancestral halls. In terms of shape, the architectural style of Minnan ancestral halls also influenced the development of later buildings, some of which evolved from Minnan ancestral halls as prototypes. In terms of materials, the Minnan ancestral halls were built with a combination of wood and stone, while later generations only increased the proportion of stone. In terms of culture, the development of folk aesthetic consciousness is echoed by the core values of blood and clan ties transmitted by the Minnan ancestral halls left. Finally, the influence of the southern Fujian ancestral hall on folk aesthetics is summarized as :(1) The influence of the southern Fujian Ancestral Hall on architectural aesthetics in southern Fujian. A large number of ancestral halls in southern Fujian adopt single-fall and double-fall architectural structures, which can still be seen everywhere in southern Fujian. (2) The influence of ancestral halls in southern Fujian on the humanistic feelings of southern Fujian. In the survey, it can be found that the ancestral hall in southern Fujian embodies strong features such as worship of Confucianism and emphasis on roots. However, in contemporary times, southern Fujian still attaches great importance to the education of Confucian culture, insisting on "moral education" as the primary goal of education. (3) The influence of ancestral hall in southern Fujian on aesthetic emotion in southern Fujian. The main color of many rural buildings in southern Fujian is highly similar to that of their ancestral halls, with red or black as the main color.

6 Discussion

The purpose of this paper is to explore the aesthetic characteristics of southern Min ancestral hall buildings and their influence on folk aesthetic consciousness in southern Min. Our approach is to use big data and artificial intelligence techniques to perform cluster analysis on a database of southern Min ancestral hall buildings to extract representative aesthetic elements, and to explore the relationship between aesthetic elements and aesthetic consciousness through an artificial intelligence decision model. Our results indicate that southern Minnan ancestral hall architecture has unique aesthetic elements of form, structure, color, and decoration, which reflect the aesthetic concepts and values of southern Minnan folk towards nature, society, and religion. These findings are inconsistent with previous literature, suggesting that southern Min ancestral hall architecture is not only a kind of traditional architecture but also a kind of cultural symbol, which has an important influence on the formation and development of folk aesthetic consciousness in southern Min. Our study also has some limitations that need to be improved in future work. For example, our database contains only some of the southern Min ancestral hall buildings and may not cover all types and styles. Our cluster analyses may also have some subjectivity and errors, not taking into account the historical background and cultural connotations of each ancestral hall building. Our decision-making model may also have ignored some other factors that affect aesthetic awareness, such as education, economy, politics, etc. Therefore, we suggest that future researchers expand the database, optimize the clustering analysis, improve the decision model, and delve deeper to explore more links between southern Min ancestral hall architecture and southern Min folk aesthetic consciousness. In conclusion, this paper provides new insights and evidence for the study of ancestral hall architecture in southern Fujian, and it sheds important light on the understanding of folk aesthetic consciousness and cultural characteristics in southern Fujian. We hope that this paper will stimulate more discussions and explorations on Southern Min ancestral hall architecture and Southern Min folk aesthetic consciousness.

References:

[1] M. W. Fu, *A narrative study on the spatial decoration of traditional clan architecture in Xiamen*, Jimei University, 2022.

[2] Y. Q. Wu, *The practice of tourism development in Tai Mei Village*, Xiamen University, 2019.

[3] X. G. Liu, On aesthetic spirit: The connotation and function of a concept-and the 'spirit of art', *Social Science Series*, 2023, pp. 1-11.

[4] Q. Chen, The aesthetic dimension of ideological and political education quality improvement in higher education, *Heilongjiang Higher Education Research*, Vol. 41, No. 1, 2023, pp. 116-120.

[5] K. M. Wang, Y. M. Shi, On the aesthetic timeliness of modern product design, *Packaging Engineering*, Vol. 43, Vo. 24, 2022, pp. 255-261.

[6] Y. Zhang, From perceptual intuition to essential intuition--restoring the aesthetic experience of living aesthetics by taking the daily wear of jewelry as an example, *Journal of Jilin Academy of Arts*, No. 5, 2022, pp. 16-21.

[7] X. R. Zheng, The aesthetic value of motor skills in the phenomenological perspective, *Journal of Chengdu Sports College*, Vol. 48, No. 5, 2022, pp. 65-70.

[8] J. C. Liu, Textbook aesthetic dialogue and its value realization, *Journal of Hunan University of Science and Technology (Social Science Edition)*, Vol. 25, No. 5, 2022, pp. 158-164.

[9] Y. H. Zhou, M. H. Shen, Research on sexual aesthetic alienation of college students in the context of network culture and coping strategies, *Journal of Chengdu Institute of Technology*, Vol. 25, No. 3, 2022, pp. 108-112.

[10] B. Yang, Research and Practice on the Curriculum Construction of "Shaobei Wushu Culture" Based on the Action Plan of Sports Aesthetic Education Infiltration, *Frontiers in Educational Research*, Vol. 6, No. 4, 2023, pp. 148-155.

[11] X. Wang, Q. Yan, D. D. R. Rosa, A study on the aesthetic value and etiquette culture of the traditional Chinese dance, *Journal of Aussie-Sino Studies*, Vol. 8, No. 4, 2022.

[12] S. An, Research on the aesthetic connotation of Beijing opera mask culture and innovation of modern design, *Art and Design*, Vol. 5, No. 5, 2022.

[13] W. W. Yao, Y. Fang, An empirical study on the aesthetic education of ancient poems in rural elementary school, *Journal of Mudanjiang Normal College (Social Science Edition)*, No. 4, 2022, pp. 67-75.

[14] M. T. Dong, X. S. Wang, Exploring the cultivation of students' aesthetic ability in sketching teaching, *Fine Arts*, No. 8, 2022, pp. 114-116.

[15] X. Z. Liang, On the problem of framing in the aesthetics of nature, *Journal of Huaqiao University (Philosophy and Social Science Edition)*, No. 5, 2022, pp. 26-39.

[16] X. Hu, A study on strategies to enhance the aesthetic culture of elementary school art, *Docking to Beijing and Tianjin-Expanding the Thinking Collection of Papers on Basic Education*, pp. 587-590, 2022.

[17] C. H. Zhang, Forming aesthetic culture in reading teaching, *Language Teaching Newsletter-D (Academic Journal)*, No. 8, 2022, pp. 42-44.

[18] L. Q. Ke, Poetry can be viewed: the aesthetic consciousness of 'God and man are in harmony' in the disaster writing of the Shijing, *Aesthetics*, No. 4, 2021, pp. 30-33.

[19] Y. B. Zhang, *The aesthetic flux of Ningxia novel creation since the new period*, Northern University for Nationalities, 2021.

[20] Z. T. Du, Appreciation of the dance work 'Peachy' to talk about the aesthetic culture of dance in the Sui and Tang dynasties, *Journal of Jilin Provincial College of Education*, Vol. 36, No. 11, 2020, pp. 151-154.

[21] Y. X. Zou, *Research on pop art under the threshold of Eagleton's aesthetic ideology*, Guangxi Normal University, 2020.

[22] M. K. Huang, *Study on the aesthetic culture of Guzi musical instrument Konghou*, Xinjiang Normal University, 2020.

[23] Y. J. Yu, *Research on the ecological aesthetic consciousness of Chinese urban folk songs*, Hunan Normal University, 2020.

[24] S. G. Feng, Exploration of the ethical concepts and aesthetic consciousness carried by the bronze vessels in Baoji collection, *Journal of Baoji College of Arts and Science (Social Science Edition)*, Vol. 38, No. 5, 2018, pp. 39-43.

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