



Spatial Characteristics Analysis of Cuiwei Historical Area Based on Depthmap Theory

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ABSTRACT: Although people can walk out of Cuiwei village, they are always in a confused state, and it is difficult to grasp the spatial form of the whole area. Taking Cuiwei village in Qianshan, Zhuhai as an example, based on the theory of spatial syntax, this paper analyzes the integration degree of ancient village vision and the spatial characteristics of historical location, the understandability degree and integration degree of village vision, the control value of vision and the spatial characteristics of historical location, and puts forward relevant suggestions for the future renewal of villages.

Keywords: Ancient villages, Historical Location, Node Space, The Integration of Vision; View Control Value, Intelligibility

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INTRODUCTION

The location of Cuiwei Village

Cuiwei Village is located in Qianshan, Zhuhai. It is currently the largest project in the renovation of the old village. After the construction and re-planning of the old relocated houses, the Cuiwei Historical District has been formed, which is also one of the typical old reform projects that the people are focusing on. However, its current stage is out of touch with the construction and development of Qianshan area. The distribution of points of interest and facilities in the block is few and uneven, and the business function is single, which makes the village commercial block less dynamic. The development of tourism, service industry and modern urbanization does not match, and the popularity of the block is low, making it difficult to attract outsiders to come for consumption and inspection. The public space available inside the block, that is, the space for accommodating the activities of villagers and foreigners, carries a large number of behavioral activities that are difficult for people to control, and the space area is small, which makes the agglomeration function poor.

LITERATURE REVIEW

Zhuhai is the core city of the Guangdong-Hong Kong-Macao Greater Bay Area, one of the four major bay areas in the world. At present, it attaches great importance to the study of ancient villages. For example, relevant government departments have compiled and published historical records such as "Zhuhai Party History Knowledge" and "Zhuhai Village Situation". Filmed a series of short films "Inheritance", launched the "Zhuhai Local Situation Publicity Month", and organized "Always Keep the Original Heart and Always Take the Mission - Zhuhai History Exhibition of the Communist Party of China". There is also the second reprint of "The Three Red Heroes of Zhuhai" and "Yang Pao'an's Thought and Research". Have a deeper understanding of the local traditional culture. However, it still needs to be explored how specific historical villages can further develop their own path.

METHODOLOGY

Through the method of on-the-spot investigation and architectural drawing analysis, this paper studies the spatial characteristics analysis of Cuiwei historical area.

Analysis of the integration degree of vision and the spatial characteristics of historical areas

Analysis of village vision integration

The integration degree of vision is to analyze the possibility of space being observed by people in combination with the perspective of people, which can well reflect the potential in the space. Its value can be expressed from the color on the figure. The warmer the color, the higher the integration degree of the space, that is, the higher the agglomeration coefficient, and vice versa. It can be seen from the figure that in the internal street space of Cuiwei village historical block, the areas with the highest degree of vision integration are concentrated in the entrance of the street market straight street, road a, renheli, zhongheli,

dunmuri, tengfengli, and the external space of Mei song Wu Gongci. It shows that these streets and alleys have a high degree of vision integration and a shallow depth of global vision, that is, people can see other elements of the space without many turns, and have a good visibility and guiding role in the whole space system. The second is the external space of Cuiwei street, Dafang street, Changshui street, Sanwang temple, Huishan Wu Gongci, Wu's great ancestral temple, jieweng Wu Gongci, and the third is the external space of Jinhua temple, Guandi temple, and Caibo temple, which shows that these areas have good performance, that is, to a certain extent, they can increase residents' mutual viewing and trigger block exchanges.

Analysis of village vision intelligibility and integration

Observe the visual intelligibility analysis map of the block. The scattered points in the map are dense at first, and the distribution of scattered points is relatively continuous. At two-thirds of the area, the light blue has not changed, and the dark blue area has obvious faults. At the back, two areas are separated. The dark blue area is the space in the middle and east of the Cuiwei historical block, and the connection value of these spaces is generally lower than that of other areas, The dark red areas are generally concentrated in the upper right, far away from the function K value. Observing the visual integration map, which is located on the west side of road a, shows that the core area in the village is concentrated on one side of road a, the core area is seriously inclined, and the change range of the connection value is significantly larger than the change range of the integration degree. After quantification, the result can be obtained: the value of the visual area intelligibility is 0.394, showing a low degree of correlation, It shows that users are less likely to guess the structural form of the whole cyberspace of Cuiwei historical block according to the things they see in the local space.

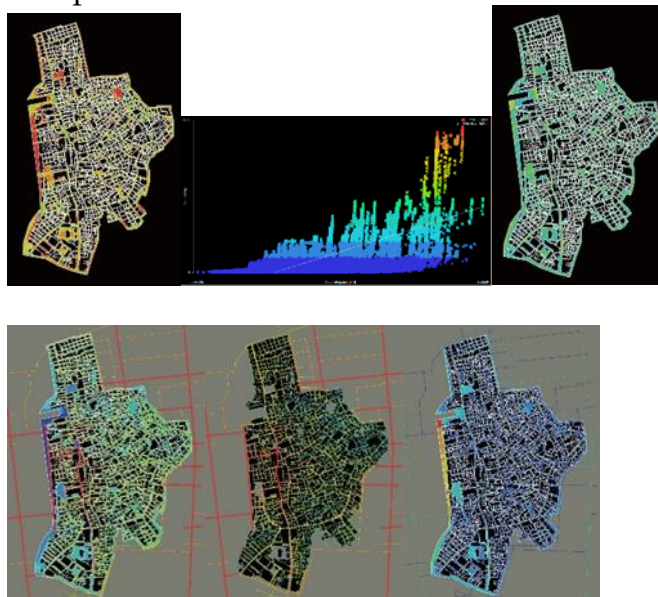


Figure 1. Visual Field Concentration

Figure 2. Visual Area Intelligibility Analysis Diagram of Cuiwei Block

Figure 3. Visual Field Control Value

figure 4. visual depth and integration axis superposition diagram of Cuiwei village

Figure 5. integration axis diagram of Cuiwei village

Figure 6. visual connection value and connection axis superposition diagram of Cuiwei Village

Image source: drawn by the author

Analysis of visual field control value and spatial characteristics of historical sections

Analysis of village view connection value

When analyzing the correlation between visual connectivity and the spatial characteristics of historical areas, taking public space as the research object, taking the closed area of buildings as the boundary, and measuring whether the spatial connectivity is close within a certain area, it can reflect the spatial accessibility of people in the historical and cultural block of the whole Cuiwei village. The full axis analysis includes all the possibilities of the flow of villagers in Cuiwei site, which is the overall response between the activity carrying capacity of internal people and the connectivity of public space. The CAD model of Cuiwei historical block is imported into Depthmap to analyze the whole axis of public space. Mingzhu South Road, Cuiwei street, jieshizhi street, Dafangstreet, Changshui street, Sanwang temple, Jinhua temple, Guandi temple, Caibo temple, Rongzhai Wu Temple, Biyue Wu Temple and Meisong Wu Temple are all good carriers of crowd activities. The visual field integration is high and the visual depth is low. The visual integration and axis are superimposed, as shown in Figure 7, It can be seen that the highest area within the village is road a. Because the total axis contains too many elements, although it is quantified, the straight line is drawn artificially, so it will inevitably produce some errors. Therefore, it is necessary to summarize and analyze the topological relations of the same kind, and get the topological relations that the relevant axis can well summarize the spatial structure.

Concept of village visual depth

Visual depth refers to the accessibility between one element and other elements in an open space. The total number of turns of the line of sight is required. The lower the value of visual depth, the more attention it attracts to people's line of sight. On the contrary, it is not easy to attract people's attention. Superimposing the visual depth map with the minimum axis map, as shown in Figure 5, can reflect the relevant characteristics of the public space in Cuiwei village. For Cuiwei village, different from the scale space of modern big cities, most of the residential buildings in the village are family living spaces with strong privacy, and the external space of residential buildings is the focus of people's visual appreciation and spiritual perception.

Analysis and update method of historical street and lane vision control value

The view control value is roughly the same as the axis control value, and the area of the current neighborhood relative to the total area of the immediate neighborhood is calculated. The field of view control value helps highlight the

area where the observer can see a large view of the spatial layout. It can be seen from Figure 3 that where the field of view control value is high, an observation deck or main sign can be set at the top of road a, the public space of Huishan Wu Gongci, Wu's great ancestral temple, jieweng Wu Gongci and Sanwang temple, as well as the four streets scattered in Dafang Street, jieshizhi street, Cuiwei street and Changshui street. The observation platform can not only let people watch the structure of the whole village, but also attract tourists to stop and improve the vitality of the space during performances and related theme activities. The main signs set beside the road can make people more clearly understand the direction of the village, enhance the correlation between people's local perception and overall perception, and people will no longer get lost. So as to attract more people to visit the block, and then improve the integration, agglomeration and understandability of the whole historical streets and lanes.

Village visual depth analysis and updating methods

Through the visual depth analysis of the historical area, it can be found that the color of the depth value of the whole area is relatively uniform, indicating that the overall permeability of the block is poor. The color of road a area is blue, indicating that the depth value of this area is low, which is easier to attract the attention of people walking, and can win people's attention. People standing at this location can see more space than people in other spaces, so they can have a better grasp of what happens in more streets and alleys. They can not only observe what happens to users in the opposite alleys, And can well predict the various situations that happen in their own streets and alleys. Therefore, for the residents of Cuiwei village, this kind of space is an environment with a relatively broad vision, gathering a certain number of business forms, which also well verifies that they play an irreplaceable role in forming the lives of villagers in the streets and lanes. Cuiwei street has high connectivity, narrow internal streets and alleys, strong twists and turns, and great occlusion of sight. By superimposing the visual depth map and the integration line, as shown in Figure 5, we can summarize the characteristics of four typical public spaces in Cuiwei historical block, as shown in Figure 7-14.

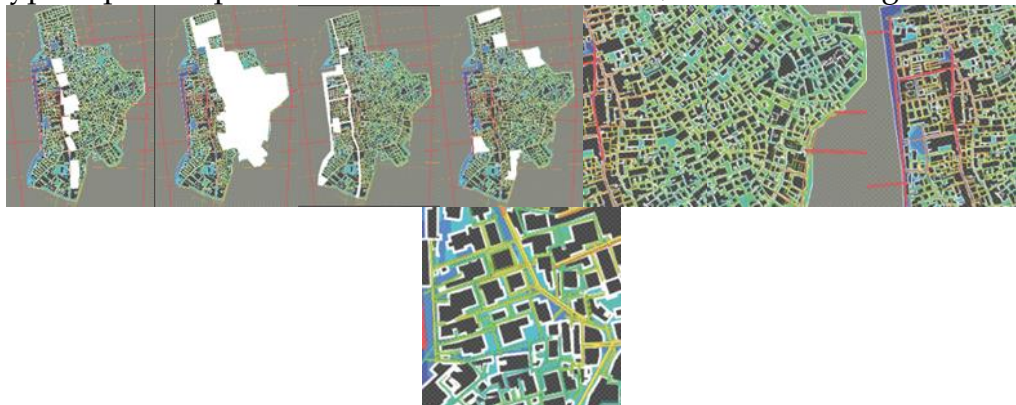


Figure 7. High Visual Depth and High Accessibility
Figure 8. High Visual Depth and Low Accessibility
Figure 9. Low Visual Depth and High Accessibility

Figure 10. Low Visual Depth and Low Accessibility

Figure 11-14. Typical Representative Areas

Image source: self drawn by the author

High visual depth and high accessibility: the main traffic trunk road in the west of Cuiwei village is Mingzhu South Road, the streets crossing Mingzhu South Road are Cuizhu 1st Street and Cuizhu 2nd Street, the main traffic trunk road in the East is cuiqian North Road, and the streets crossing cuiqian North Road are Honghu street and cuixian Road. The two main roads are urban branches with high accessibility. The intersections of the two urban branches and the secondary streets form a space with high visual depth and high accessibility, and commercial houses along the streets outside the village are thriving. Within the scope of Cuiwei village, there used to be relatively prosperous businesses along Dafang street, jieshizhi street and Cuiwei street. Besides retail stores, health service centers, textile stores, etc., there are also many stalls on both sides of the street, which carry specific activities and have high accessibility. Gongci, ancestral temples and menfang are also distributed along both sides of the street. Therefore, in the later organic renewal of street space, this highly recognizable space can be used as an important link to open up the internal blocks, set up specific signs, and rebuild more prominent gateways.

High visual depth and low accessibility: there are a large number of second-class residential land in renheli, zhongheli, dunmuli, yangzixiang, shengtangli, yiguli, nanmingli and chazixiang, which are scattered and dense with high visual depth. At this stage, due to the development of urban construction, the area will be demolished in pieces in the future and replaced by a large number of complexes. Most of these buildings belong to illegal buildings built in disorder in the middle and late stages, blocking the dense street and lane pattern of the original small street area road network, resulting in low overall integration and weak accessibility, and people are easy to get lost when walking inside. This kind of space is a deformed product of the historical block in the process of urban construction. In the process of renewal, we should consider the ancient buildings in this area, divide and extract them, effectively protect them, deal with the new and old spatial relationship, and skillfully reduce the impact of large complexes on the historical area.

Low visual depth and high accessibility: a space with low visual depth and high accessibility is formed along Dafang street, street straight street to Cuiwei street. Through the quantitative analysis of the above spatial syntax, it can be seen that the street has a high degree of integration, in which the integration of the street straight street is the highest in the whole village. Through the collation of historical data and field investigation and analysis, it can be seen that this road section carries a certain amount of service facilities. In the prosperous period, it carries a large number of service facilities, in addition to the businesses along the street, there are stall facilities. Although the streets and lanes in Cuiwei village have a large spatial texture density and a high ratio of width to height, resulting in poor visibility, it does not affect the vitality of the block in this area at all. As the historical heritage of the long-term

development and evolution of Cuiwei village, this kind of space is the space of the traditional lifestyle of Cuiwei villagers, and has a good bearing role. It is of great significance in the historical block, with relatively high protection value. There are also many ancient buildings left on both sides of the street. It should be considered in the protection and organic renewal, which can play an important role in the revitalization of the street.

Low visual depth and low accessibility: low visual depth and low accessibility are common in historical blocks. For Cuiwei historical block, the streets are narrow and tortuous, and the spatial integration and understandability are low. Because it is located in the corner of Cuiwei village and has certain communication with the outside, the visual depth is low. Due to a large number of illegal buildings and disorderly built wires in the block, the overall regional road network system of the village is broken, The accessibility is low, and the main purpose of the renewal of Cuiwei historical block is to dredge the street space system in the process of organic renewal.

To sum up, as a historical block, Cuiwei village is not only relatively weak in the urbanization process of the whole Qianshan area, but also gradually covered by various types of construction land, making the phenomenon of road fragmentation more serious. However, Cuiwei village, the largest village in Zhuhai, is also located in the Qianshan area, with the urban rail pearl station in the northwest and the Tanzhou area in Zhongshan in the West. It has obvious geographical advantages, so it has a strong bearing capacity. After the renovation, it will greatly promote the economic development of the Qianshan area, drive the surrounding businesses, and attract more businesses to settle in.

There used to be a large number of second-class building land in Cuiwei historical block, which will be re-rectified in the process of renewal and reconstruction. The spatial scale of streets and lanes is relatively deep. In addition to the direction from Dafang street, street straight street to Cuiwei Street on the west side, the spatial integration is good, the overall permeability is poor, and there is a lack of perspective and the construction and utilization of public space. It is difficult to attract the flow of tourists and foreign residents, resulting in poor mobility. Being isolated from the outside world for a long time eventually leads to poor continuity and acceptance of historical features.

CONCLUSION

With the rapid development of China's economy and the gradual acceleration of urbanization, there are a large number of ancient villages whose space has been abandoned and compressed, which has caused serious damage to the original pattern of ancient villages. The development of village blocks is closely related to the protection and organic renewal of blocks, the embodiment of commercial value, the connection of internal and external traffic road networks and economic development. Among them, the theory of spatial syntax plays a crucial role in the research and analysis of the spatial morphology of village historical blocks, and has important reference value for the future protection and renewal of ancient villages.

ADVANCED RESEARCH

This paper studies spatial characteristics analysis of Cuiwei historical area based on Depthmap theory. However, each region has its own architectural identity and different cultural heritage. Our current direction in the future can only be borrowed from historical villages of the same type or buildings in the same area. This is also a limitation. In the future, you can also try to add quantitative research methods to make design decisions more scientific.

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