Journal of Mechanical, Civil and Industrial Engineering
ISSN: 2710-1436
DOI: 10.32996/jmcie
Journal Homepage: www.al-kindipublisher.com/index.php/jmcie

JMCIE
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Research on Spatial Memory of Architectural Narrative Based on Spatial Syntax Theory: Wushan Dormitory of SCAU University as an Example

Junzhang Chen[1], Yile Chen[2] ✉ Liang Zheng[3] and Qiang Tang[4]
[1]Faculty of Innovation and Design, City University of Macau, Avenida Padre Tomás Pereira Taipa,Macau SAR, China
[23]Faculty of Humanities and Arts, Macau University of Science and Technology, Avenida Wai Long Taipa, Macau SAR, China
[4]Shunde Polytechnic, Shunde District, Foshan City, Guangdong Province, China
Corresponding Author: Yile Chen, **E-mail**: 2009853gat30001@student.must.edu.mo

| ABSTRACT
The campus buildings carry the reading time and historical stories, while the dormitories carry the memories and dreams of college students. This article takes the Wushan Dormitory of SCAU University as an example. By digging into the main narrative elements of the internal space of the Wushan Dormitory, the relationship between its space and events is analyzed. Based on the perspective of narratology, the convex space analysis method using Depthmap software technology under the space syntax theory is used to analyze the dormitory narrative space from the three main levels of the bedroom space, corridor space and staircase space. Analyze and explore the connection value of the horizon and the depth of the vision so as to effectively and reasonably combine the qualitative theory of narratology with the quantitative analysis of space syntax. By observing the logical relationship between the internal space and space of the dormitory building, the relationship between the dormitory building and the campus, it is theoretically and systematically explained, and people's understanding of the space narrative theory is deepened. Reference suggestions are given for the activation and protection of the inner and outer spaces of the Wushan Dormitory in the future.

| KEYWORDS

Space Syntax, Narrative Space, Place Memory, Campus Architecture; Wushan Dormitory, Protection and Renewal

| ARTICLE DOI: 10.32996/jmcie.2022.3.1.5

1. Introduction

The narrative space is a place where collective memories are preserved and multiplied. Because of people's own consciousness or the baptism of time, it becomes a representative place of collective memory. From individuals or groups to countries, these places with memories are extremely representative. Symbolic and functional. For example, in a certain village, there are temples, ancestral halls, and public shrines where ceremonial ceremonies are held regularly, or a certain family's mansion handed down for centuries by a large family, or a certain dynasty that has played an important role in foreign trade and exchanges; A wharf, port, or teaching building, dormitory building, administrative building that has been handed down over a century, as well as the century-old trees, ancient wells, or ponds, swimming pools, vegetable gardens, etc., with stories.

In the process of rapid urbanization, China has made great achievements in reform and opening up, but there have been many problems that cannot be ignored. For example, China's urban landscape is becoming more and more similar, and the multi-centre, pie-like "one-thousand-one-side" city. This phenomenon has been abandoned by people. How to tap the regional and cultural characteristics of urban areas has become a problem for planning scholars. Wuzhen Water Town, Old Town of Lijiang, West Lake Scenic Area, Classical Gardens of Su-zhou: Humble Administrator's Garden, Qinghui Garden, Yuyin Garden, Ke Gar-den, Feng Huang Ancient Town, etc., in modern society, the seemingly backward gardens, small villages and rivers can be welcomed by the public. Every year, a large number of tourists come to travel and observe, and one of the important reasons for their longevity is that the creation of narrative space cannot be replicated. The uniqueness and singularity of it attract people to come to experience

the cultural characteristics and the beauty of the scenery. Therefore, the use of narrative space to study different historical buildings in different areas of the city can help to find characteristic elements that truly reflect contemporary regional characteristics and souls so as to construct highly regional cultural characteristics that conform to the historical context of the city; the spatial structure deviates from the unique nature of the city.

2. The development history of Wushan Street and Wushan Dormitory of SCAU University

Wushan Street was built in 1953. There are two different descriptions of Wushan Street in the " The Story of Tianhe": First, Wushan Street was reorganized from Wushan Town. The street is named after the Wushan area and belongs to a low mountain and hilly area. Second, the area where Wushan Street is located is surrounded by Chashan, Songshan, Black Mountain, Phoenix Mountain, and Xiang-gang Mountain, with a basin formed in the middle, which is known as the "Five Horse Drinking Spring". Tianhe District was established in 1985, and Wushan Street was placed under the jurisdiction of Tianhe District. There are a large number of immovable cultural relics and historical buildings in the street, which are bunkers, teaching buildings and campus buildings with typical Lingnan architectural style. These cultural relics have witnessed the War of Resistance to Japan to the fall of Guangzhou, from the War of Liberation to the founding of New China, the teachers and students of Wushan are opposed to the civil war, and the architecture and urban space bear the spirit of the time of indomitable and tenacious struggle in the humanities of Canton. There are 64 immovable cultural relics and 27 historical buildings, which are mainly distributed in colleges and densely populated communities, and are important places for daily life and learning.

In the 2017 local regulations, Guangdong Province implemented the "Law on the Protection of Cultural Relics of the People's Republic of China", and the Guangzhou Municipal Bureau of Culture, Radio, Film and Tourism issued a notice on the Trial Measures for the Activation and Utilization of Cultural Relics in Guangzhou, as well as the "Trial Version of Inspection Measures for the Protection of Cultural Relics in Guangzhou", Both put forward the emphasis on the protection of historical buildings.

This research takes the first to fourth dormitories of South China Agricultural University (the sixth to ninth dormitories for males) as the main research objects (Figures 1 to 2), located in the area on the right side of Yuehan North Road, the main entrance of South China Agricultural University. Designed by Lin Keming, the building area is 2042 square meters, of which the building area of the fourth dormitory is about 761 square meters. The main building of the four dormitories has 3 floors, and the annex building is 2 floors high. It is a frame structure, a reinforced concrete building, and adopts clear water red. Brick exterior wall, 4 fa-cades have windows, later replaced with aluminium alloy windows. The traditional dormitory memory carries the campus cultural traditions and campus emotions and has a strong social identity. It plays a very important role in purifying the soul and comfort of students and embodies the function of cultural regulations. Although it was listed in the sixth batch of cultural relics protection units in Guangzhou in July 2007, most of the college teachers, students and community residents at this stage need to improve their awareness of the immovable cultural relics and historical buildings around them.

Fig. 1. Satellite Picture of Wushan Dormitory of South China Agricultural University. (Image source: the author intercepted from Baidu map HTTP://map.baidu.com/@12619247.212036854,2634367.3597223004,19.23z/maptype%3DB_EARTH_MAP)

Fig. 2. The space in front of the entrance of the dormitory buildings 1, 2 and 3. (Image Source: Photographed by the Author)

The reasons include: reluctance to recall the past, the once glorious small peasant economy, farming civilization has become backward productivity hindering the development of cities, and the inequality and imbalance in the development of cities and towns. The large gap between the rich and the poor is stimulating. The campus memory is unwilling to keep and even deliberately forgets the wonderful memories that the campus once brought to them. In the protection of historical and cultural heritage,

Wushan Dormitory, as one of the 64 immovable buildings, is a campus cultural heritage. People need to recognize and evaluate campus memories. Together with experts, scholars, and people from all walks of life, find and build memory places. The memory process effectively alleviates the major crisis of "fragmentation" of the campus architectural, cultural heritage and people "amnesia" so as to improve the urban space planning ideas of different scales such as the Wushan dormitory area and Tianhe District.

Fig. 3. Rendering of the 2012 refurbishment design (Image source: drawn by the Qiang Tang)

Fig. 4. Rendering of the 2012 refurbishment design (Image source: drawn by the Qiang Tang)

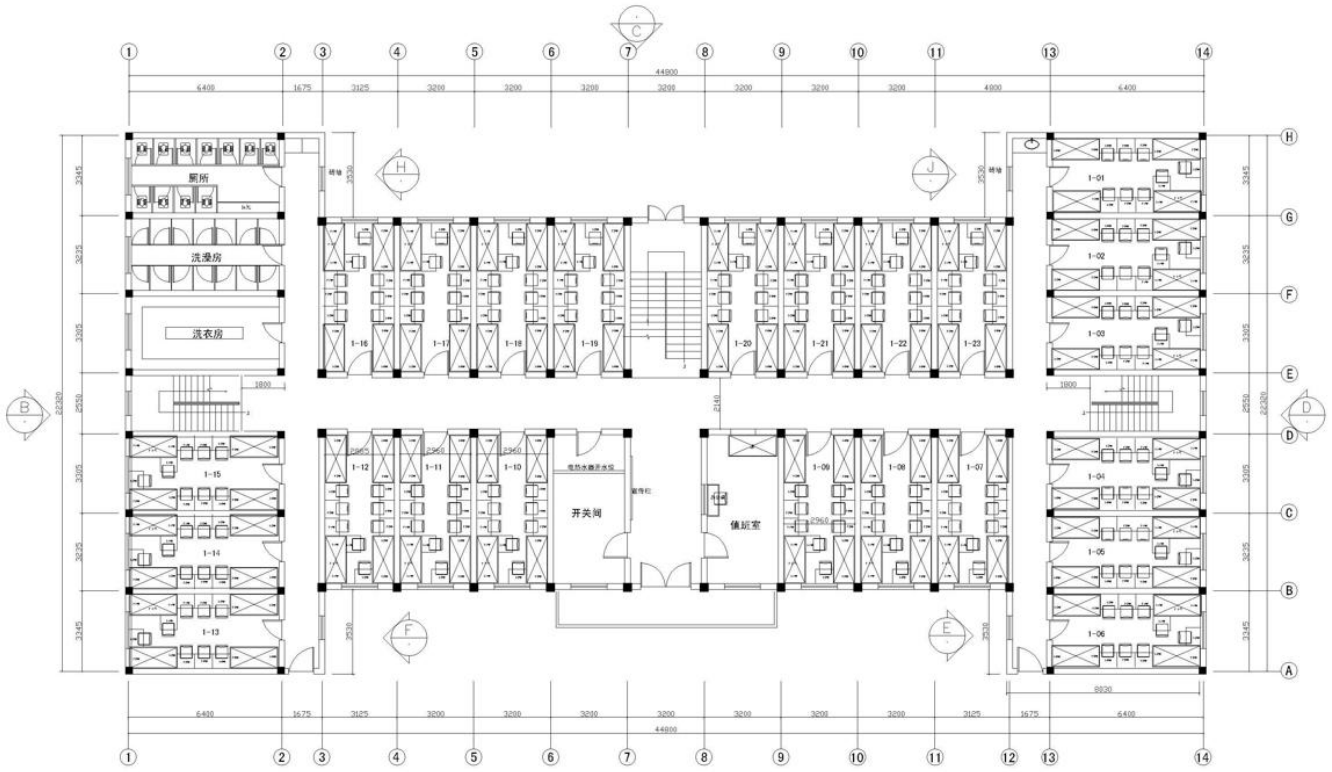


Fig. 5. Dormitory ground floor plan (Image source: drawn by the Qiang Tang)

3. Research Method: Space Syntax Analysis Technology

3.1Theoretical support

In 1970, Professor Bill Hillier put forward the concept of "space syntax", that is, the theory of spatial structure and social relations. He regarded space as a part of social life, and the core theory was "space organization", which was interpreted as a combination of space. He is the author of the book "Space is a Machine—The Theory of Building Fabrication", which considers topological and geometric related factors in the analysis, and applies it to the flow of people, vehicles and places, social abuses and crimes, and builds a model to study the operation of the city. , To identify the land use potential and micro attributes in the local grid. "Space Syntax and Urban Planning", edited by Chinese Academician Duan Jin discusses the inherent idea of space syntax: when thinking about space, space can be regarded as the background wall of people's activities and natural objects. Reshape and integrate to make the space more humane. Space syntax can be effectively combined with narrative space and can provide a structured syntactic and grammatical system for narrative space. The relationship between the two is quite close. Both adopt the mode of interpreting human history from the regional geographic space itself, which reflects the way that humans experience and use space behind different spatial attributes. The consistency of their internal logic can make the combination of the two It has become inevitable.

3.2Analysis technology

Using space syntax can quantitatively analyze the relationship between human activities and spatial organization, including spatial horizon analysis, spatial morphology analysis, and spatial organization relationship analysis. The organization simplifies the complex spatial relationship and expresses it to people, calculates the relevance in the space, explains the logic of spatial construction, and proposes a better quantitative explanation for the meaning of the narrative space, which can effectively make up for the qualitative research of the narrative space insufficiency. The convex space analysis method will divide the space and divide the scale. The results of his research are applied to social, economic and humanistic processes, and a bridge is built between the three.

The effective combination of the quantitative analysis of space syntax and the qualitative analysis of narrative theory can effectively reveal the laws in the interior of space and express them through images, which will help people understand the space. In the space syntax analysis, the space can also be analyzed for axis, the field of view, line segment, and convex space. From the macro to the micro, from the whole to the part, carry out a comprehensive and multi-level spatial analysis. According to the space syntax theory, this research adopts the horizon model to abstract the internal space of the Wushan dormitory of SCAU University into a syntactic topological relationship, analyze the spatial form of the dormitory from the perspective of topological geometry, and

construct a convex space model to analyze and focus on Wushan The spatial accessibility and agglomeration of the dormitory can more intuitively show people the spatial morphological characteristics of the dormitory. By constructing a field of the view analysis model, the perception of the space on the two-dimensional plane can be displayed through the model, which can be better analyzed the closeness of the spatial connection.

3.3Analysis process

In this research, the existing technical drawings of the Wushan dormitory building of SCAU University were cleaned up first, and the arranged floor plan of the dormitory was placed in the same layer, and the Depth-map software was imported to analyze the internal space of the Wushan dormitory. The relevant analysis of the convex polygon method has obtained the visual field connection value, the visual field Control value, the visual Depth value and the degree of pedestrian flow in the internal space of the Wushan dormitory, thereby revealing the internal logic of the internal spatial structure of the dormitory. The overall and partial indicators can more comprehensively reflect the spatial relationship and comprehensively express the fluidity of the dormitory space. In areas with a higher degree of integration, the higher the social and economic development and human activities, the integrated core is the centre of the entire area, that is, the place where there are more narrative activities.

Finally, Depthmap will automatically colour the existing space according to the level of spatial integration, marking the colour of each area. The cold and warm colour changes reflect the changing trend of the dormitory's internal space. The colder colour indicates that the average function of this space is lower than the average level, and vice versa, it is higher than the average level. Therefore, through the colour change, a better judgment can be made on the connectivity and accessibility of the different internal node spaces, and the research is conducted through the analysis of the generated graphical results, which further lays the foundation for the study of the internal spatial form of the Wushan Dormitory, and further Deepen people's understanding of research space.

4. Syntactic analysis results of narrative space in Wushan dormitory

4.1Analysis of agent robots in Wushan dormitory: high pedestrian activity in horizontal corridors

First, analyze the internal space of the dormitory by proxy robots. The red represents the most frequent paths, and the blue is the least. From Figures 6 to 8, we can see that the areas with high pedestrian activity in the first to third-floor flat dormitories are concentrated in the middle horizontal corridor area.

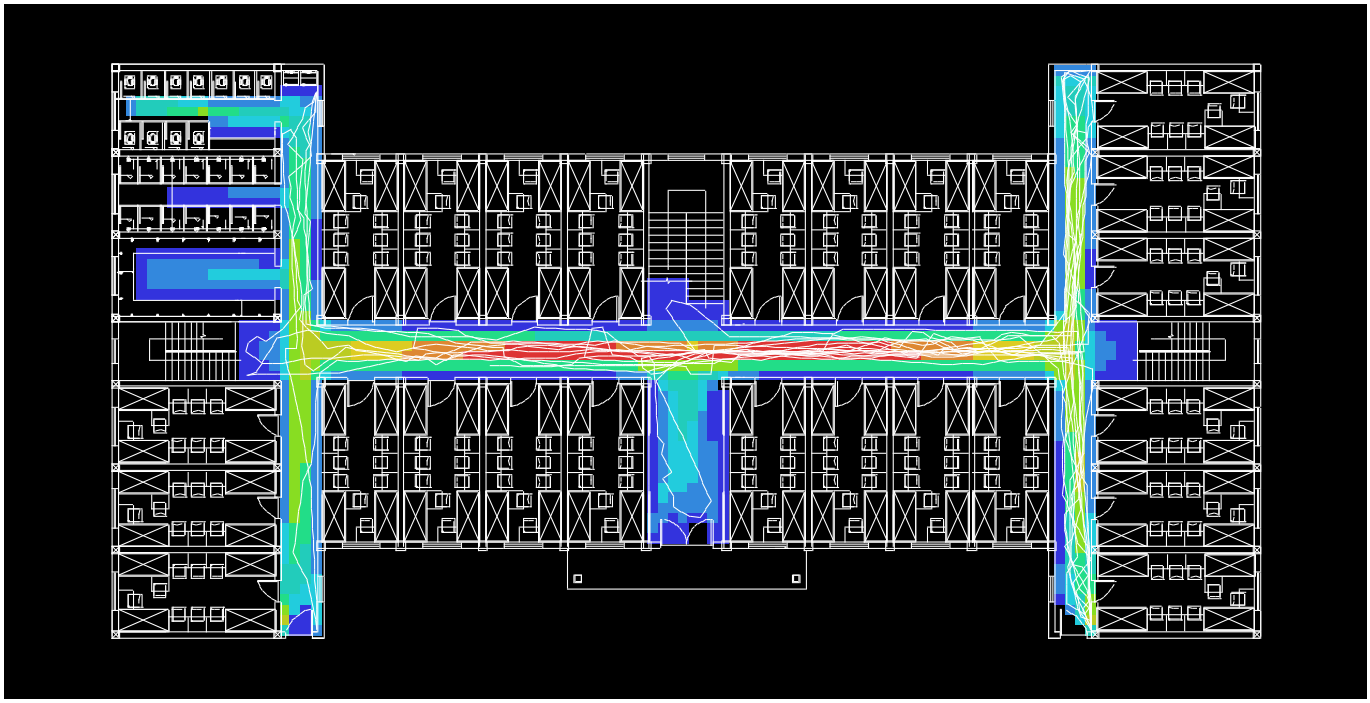


Fig. 6. Analysis of proxy robots on the first floor plan. (Image Source: Drawn by the Author)

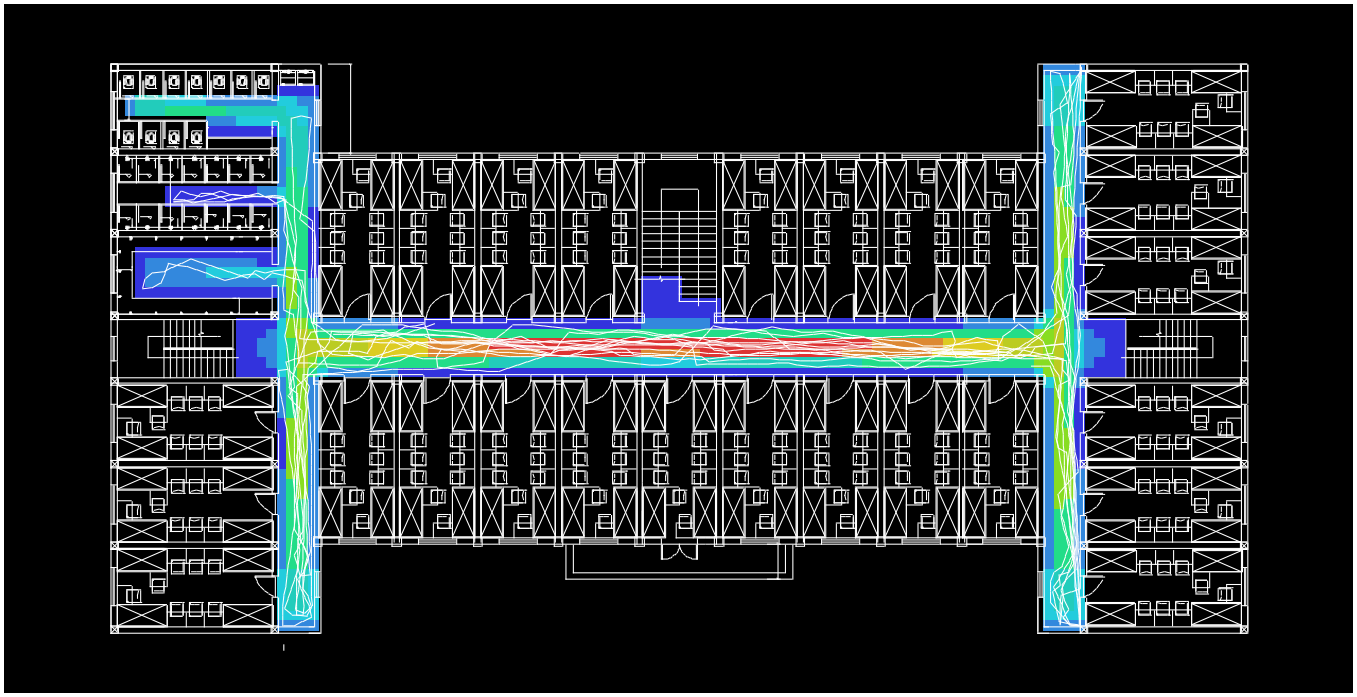


Fig. 7. Analysis of proxy robots on the second-floor plan. (Image Source: Drawn by the Author)

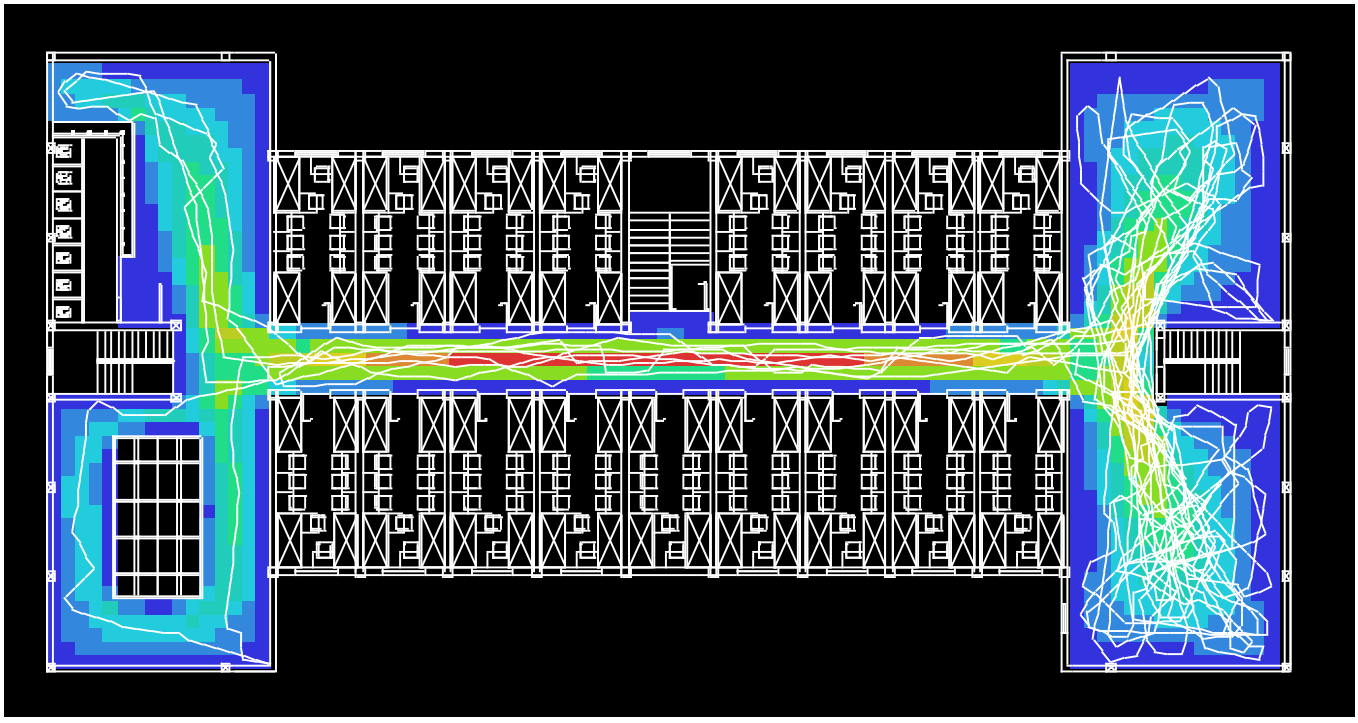


Fig. 8. Analysis of proxy robots on the third-floor plan. (Image Source: Drawn by the Author)

Analyzing the floor plan of the first floor, there are 15 dormitories, 1 duty room and 1 switch room on both sides of the horizontal corridor. There is a boiling water room inside the switch room. The area that both students and dormitory administrators need to pass through, so this area is passed the most times. In the 15 dormitories on both sides of the corridor, the number of paths that people pass through gradually decreases from the middle to the left and right sides, and the colour changes from red to light yellow. The second is the vertical corridor area, where the number of people passing through this area decreases in both the north and south directions. The colour changed from light yellow to light green. The other places have relatively few passes. The least areas are the toilet, shower, three stairs, laundry room and the lower-left door area. The colour is dark blue. Through analysis, it can be seen that this area is only used by students at night. And the washing time of each student is different, so the number of times passed by the student is less. The situation on the second floor is similar to that on the first floor.

Analyzing the three-story floor plan, the horizontal corridor has the most paths passed by students, followed by the left and right areas, which are the external platforms of the building where students can dry their clothes. Observe the area in the lower-left corner of the floor plan, where students have set up drying racks. Therefore, the number of students passing by the platform areas on both sides is more. In general, apart from the students of SCAU's main school who walk through the dormitory, there are fewer foreigners or even not going inside. The corridor space and internal dormitory space of the dormitory are less active and narrow. On the one hand, it is conducive to the formation of a more private living space atmosphere; on the other hand, it is not conducive to the mutual supervision mechanism between students, dormitory administrators and school teachers, and blind spots and blind spots are prone to appear. At the same time, the vertical corridors, horizontal corridors and external platforms on both sides of the first and second floors of dormitories have more "back"-shaped motion grids. At the same time, the "back"-shaped motion network is also easy to be used as an "intermediate form". The space transition unit plays the role of connecting the energy flow inside and outside the dormitory.

4.2Analysis of visual integration of Wushan dormitory: the strongest flow of people gather at the junction of the horizontal corridor and the vertical corridor

Horizon integration combines the crowd's perspective to analyze the degree of possibility of being observed by people. It can well reflect the potential in the space. The value can be expressed by colour. The warmer the colour, it represents the integration value of the space. The higher, the stronger the agglomeration effect of the flow of people. The same is true for the axis analysis. The warmer the colour, the higher the integration of the space, which attracts more people to gather. The colder the colour, the lower the integration of the space, and the more difficult it is to attract people to the space.

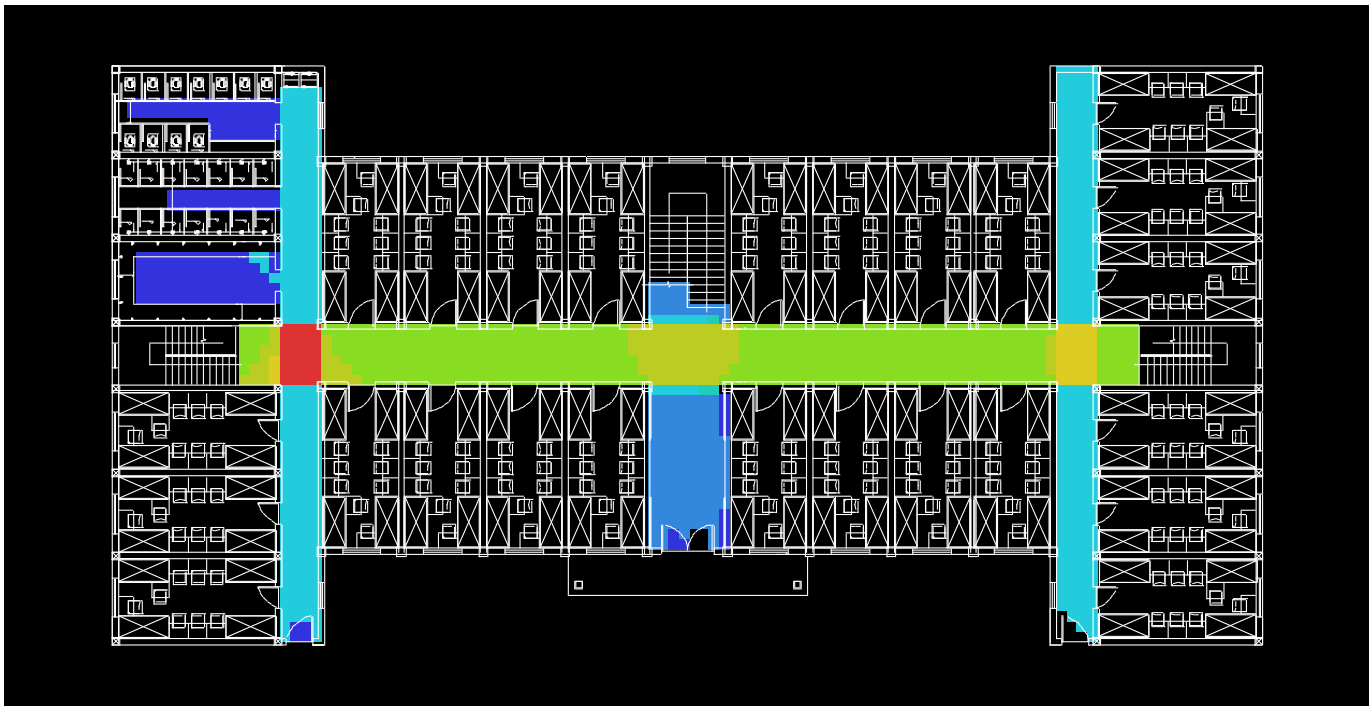


Fig. 9. Horizon integration of the first-floor plan. (Image Source: Drawn by the Author)

From Figures 9 to 14, it can be seen that the analysis of the integration of the horizon and the analysis of the spatial axis show the same trend of sorting changes. The areas with the strongest integration of the horizon are on the left side of the horizontal corridor and the vertical. At the junction of the promenade, this area is at the peak of classes. Students need to go through the stairs to get back to the dormitory. Plus, there is a door in the lower-left corner of the floor plan. So there will be more crowds. The second is the middle staircase and the right-hand staircase. The middle staircase belongs to the entrance of the dormitory gate and gathers here after passing through a corridor, so there is a large flow of people here. Then the areas with a relatively high degree of visual integration are in the middle horizontal corridor and the corridors perpendicular to the middle horizontal corridor on both sides. In addition to class, students usually pass by here, so these three corridors gather some students from time to time. The areas with a low degree of visual integration are in the laundry room, toilet and shower room. The colours of these three spaces are cool, while the axis colour is blue. The functions of these three spaces are mainly dedicated to the washing of dormitory students. Except for a certain point during the rush hour in the evening, there are relatively more students gathered. The students will not move in this direction during the rest of the time, nor will they go into these three spaces walk around. Observe the colour change of the

three-layer plane axis and the colour change rule of the overall space. The colour change trend of the middle horizontal corridor and the two vertical corridors are the same. The only difference is the platform on both sides. The colour change trend of the axis is consistent with the overall space. The colour change trend is slightly different.

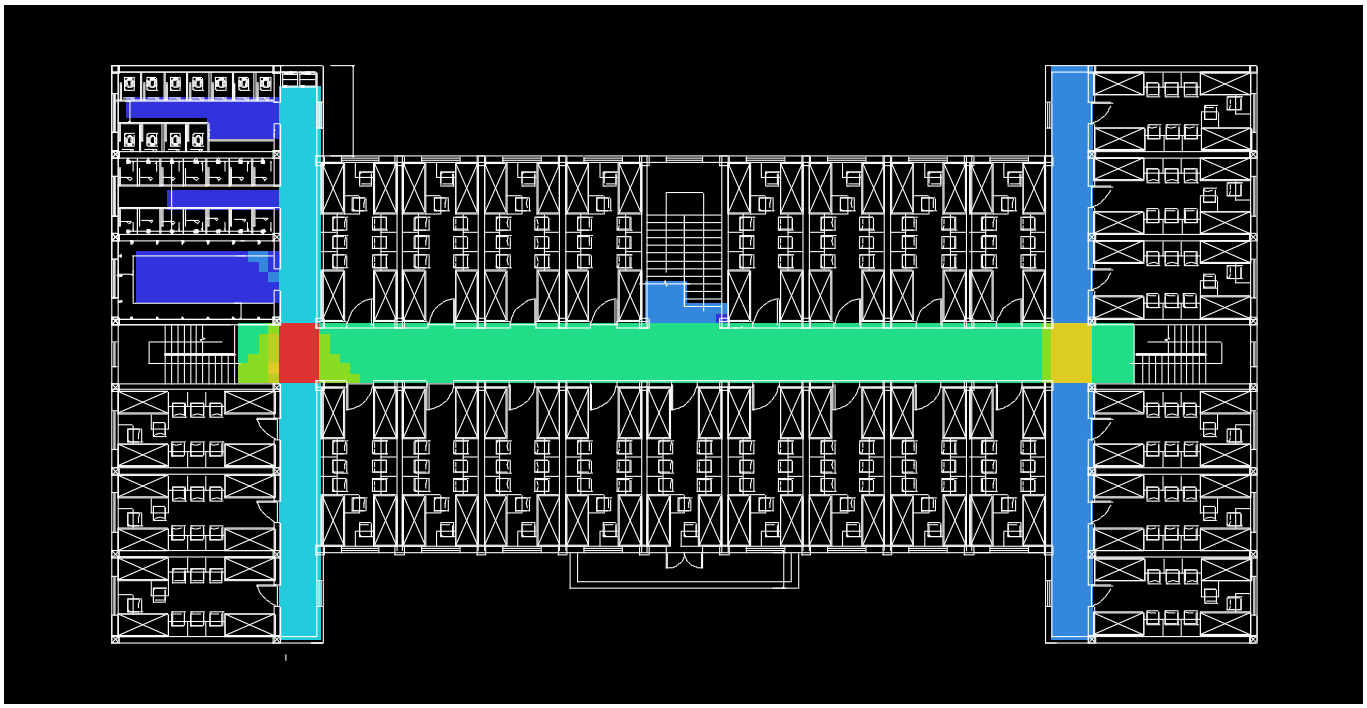


Fig. 10. Horizon integration of the second-floor plan. (Image Source: Drawn by the Author)

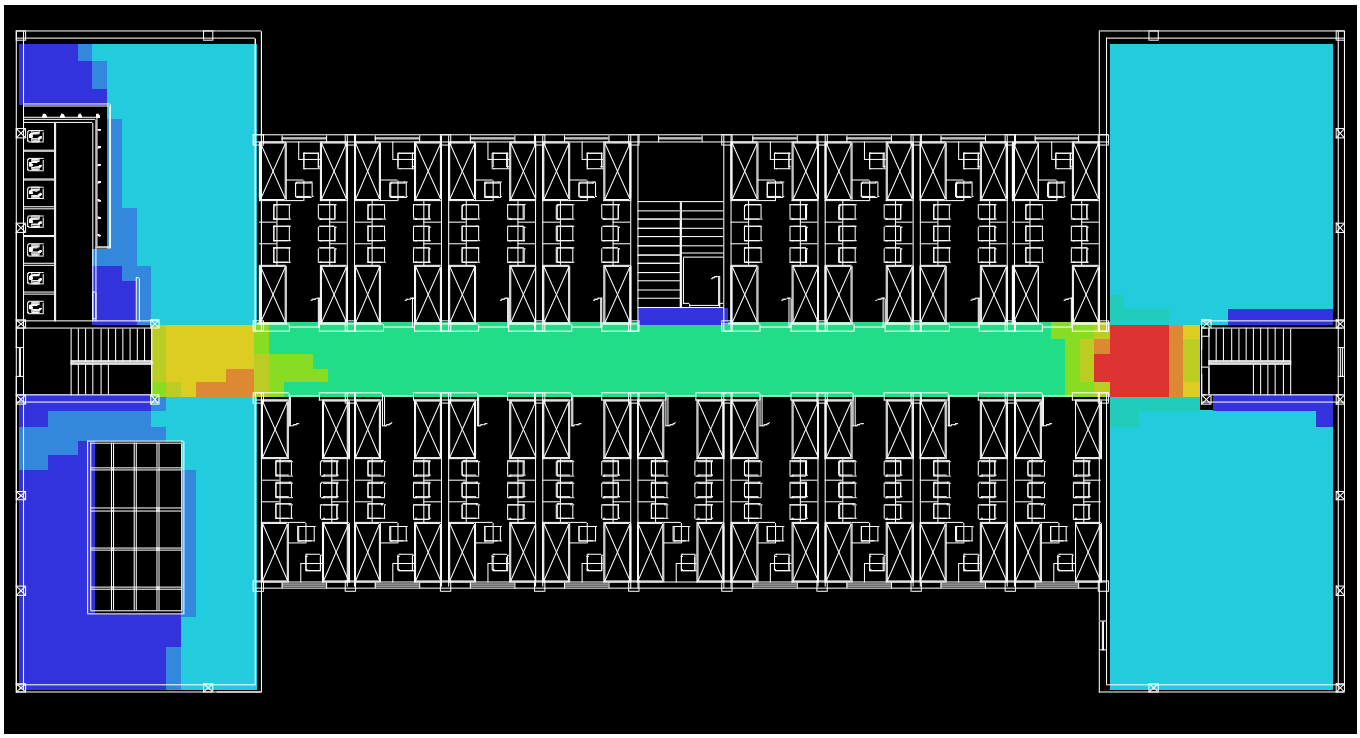
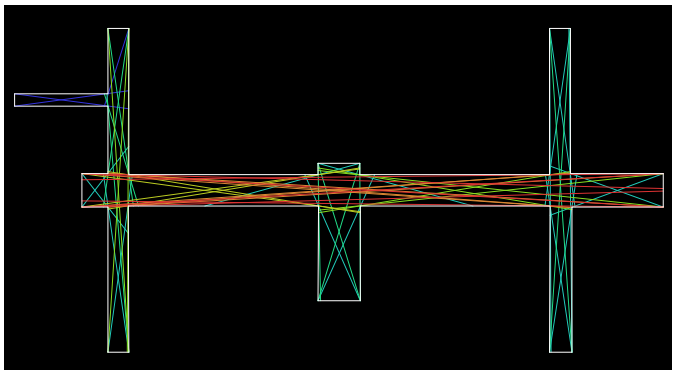


Fig. 11. Horizon integration of the third-floor plan. (Image Source: Drawn by the Author)

Through analysis, it can be seen that the layout on the left side of the third floor is the same as that of the first and second floors. There are laundry rooms, toilets and shower rooms. These three spaces serve the 17 dormitories on the third floor and need to meet the washing conditions of the students on the third floor. Therefore, the students in the three-story dormitory move more frequently to the left platform. Compared with the right platform, the left platform has more axis lines, and darker colours,

indicating that the integration of the left platform is relatively high of the impact is negligible and will not have much impact on the overall research. Furthermore, it is concluded that the study of space syntax in a certain space is a study of the overall space. It is an average value, not an instantaneous value, so the research results obtained are relatively reasonable.



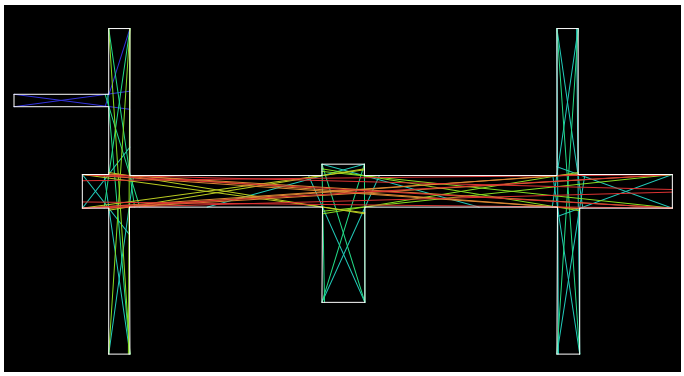


Fig. 12. Axis analysis diagram of public space on the first-floor plan. (Image Source: Drawn by the Author)
Fig. 13. Axis analysis diagram of public space on the second-floor plan. (Image Source: Drawn by the Author)

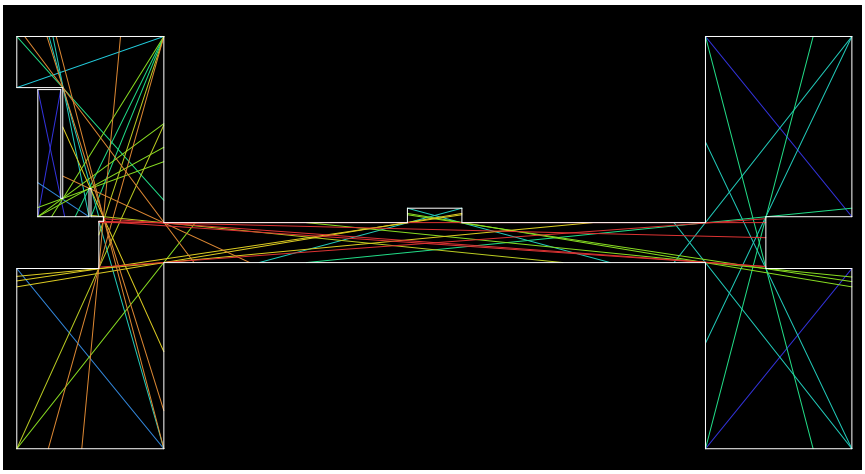


Fig. 14. Axis analysis diagram of public space on the third-floor plan (Image Source: Drawn by the Author)

4.3The agglomeration coefficient of Wushan dormitory's viewing area: the agglomeration coefficients of the first to third floors are more evenly distributed

The agglomeration coefficient of the field of view is a judgment of the visual limitation effect of the space boundary. The agglomeration coefficient is judged and distinguished by analyzing the cold and warm colours of the picture. The warmer the colour, the higher the agglomeration coefficient, indicating that it interfaces with the surrounding space. The less limited the vision, the weaker the occlusion in the system. The colder the colour, the lower the value, the lower the aggregation coefficient, and the more obscuration in the system, that is, the more intense the line of sight is oppressed in the space.

It can be seen from Figures 15 to 17 that the distribution values of the agglomeration coefficients of the first to third-floor plans are relatively even. The lowest concentration area is at the junction of the left and right vertical corridors and horizontal corridors. This area is at the corner and can lead in four directions. Therefore, the colour is dark blue and is more shaded in the system. At the same time, The rectangular area enclosed by the area is the smallest in the entire system, so the line of sight is greatly compressed. Secondly, the lower area is distributed in the centre of the plane. At the junction of the horizontal corridor and the vertical corridor, the colour of this area is light blue. The area of the rectangle is larger than the area of the rectangles on both sides, so the agglomeration coefficient will be larger. It will be slightly open. In the light blue area in the view, there is also the entrance to the shower, toilet and laundry room on the first floor. The concentration coefficient of the field of view in this area is equivalent to the middle, and the degree of compression will be slightly weaker. The colour of the remaining area in the space is dark red. It can be seen that the concentration coefficient of the field of view is relatively large and relatively average.

The space is less sheltered. Students will be concentrated on the first and second floors of the bathroom, laundry room and the third floor of the rooftop area during class, washing and drying in the evening, and occasional gatherings in the dormitory will also be concentrated on the external platform of the third-floor area, so the field of vision in these areas is more open.

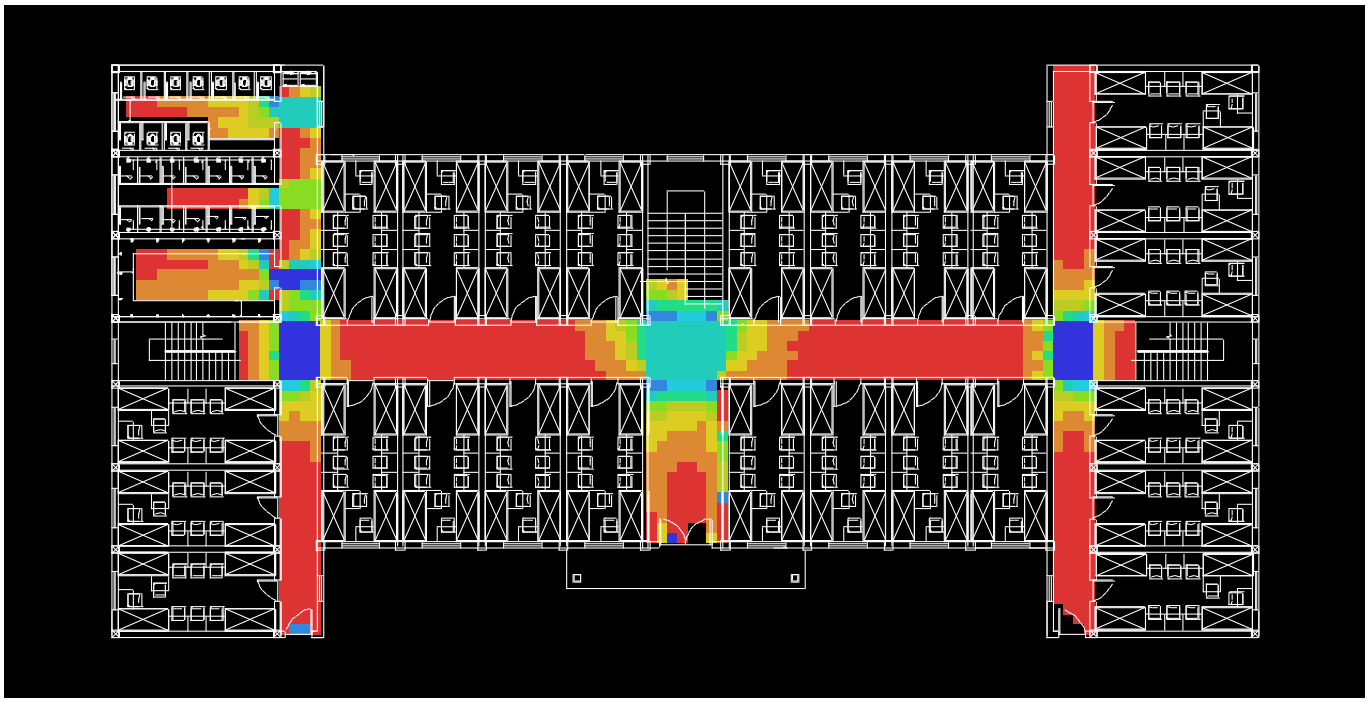


Fig. 15. Concentration degree of the horizon of the first-floor plan. (Image Source: Drawn by the Author)

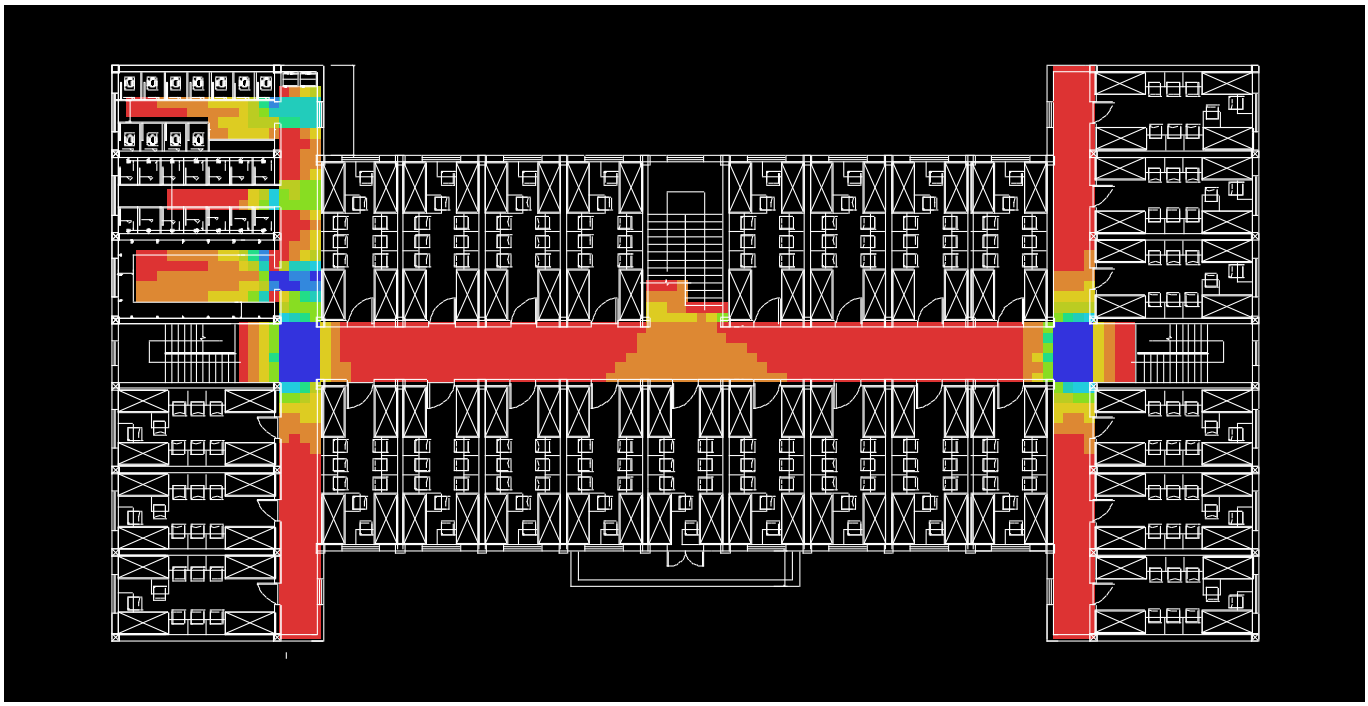


Fig. 16. Concentration degree of the horizon of the second-floor plan. (Image Source: Drawn by the Author)

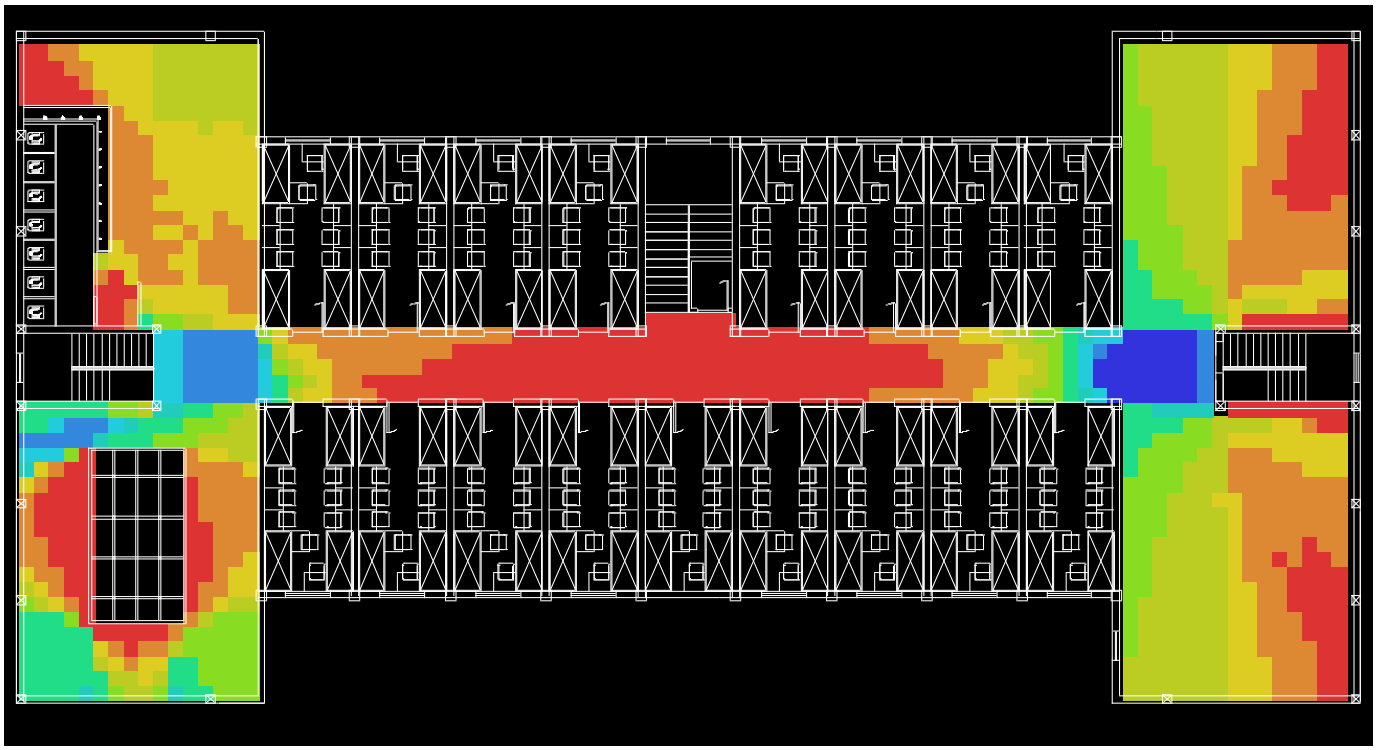


Fig. 17. Concentration degree of the horizon of the third-floor plan. (Image Source: Drawn by the Author)

4.4Analysis of Horizon Control Value and Horizon Connection Degree of Wushan Dormitory

The visual field control value is used to analyze the visual connection degree and the external space characteristics of the dormitory. The public space is the research object, the closed area of the building is the boundary, and the spatial connection degree within a certain area is measured as a measure, which can reflect the entire five mountains—the accessibility of the space inside the dormitory. The viewing area control value is roughly the same as the axis control value, and the area of the current neighbourhood relative to the total area of the immediate neighbourhood is calculated. The viewing area control value helps to highlight the area where the observer can see the larger view of the spatial layout.

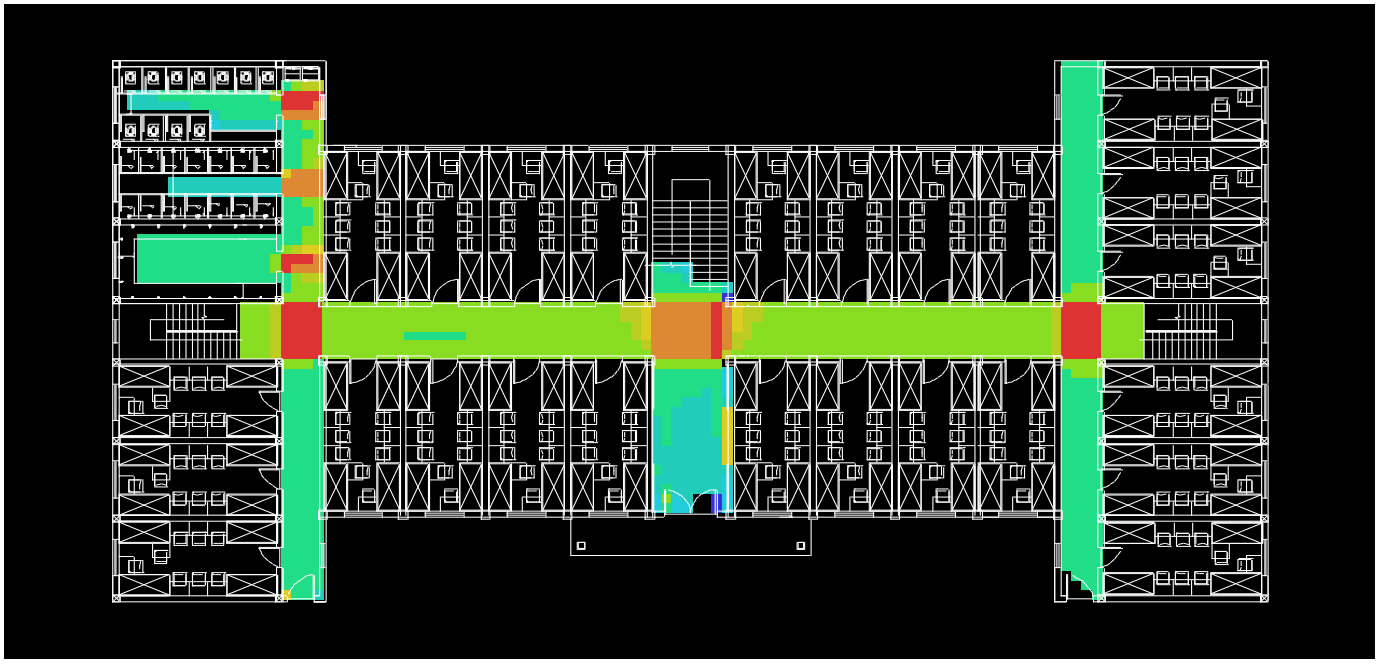


Fig. 18. Control value of the horizon of the first-floor plan. (Image Source: Drawn by the Author)

From Figures 18 to 20, it can be seen that in the first to third-floor plans, the distribution of the control value of the viewing area is relatively even, and the area with the highest value is at the junction of the horizontal corridor and the vertical corridor on the east and west sides, and it is also the area with the highest connection value of the viewing area (Figure 21 to 23).

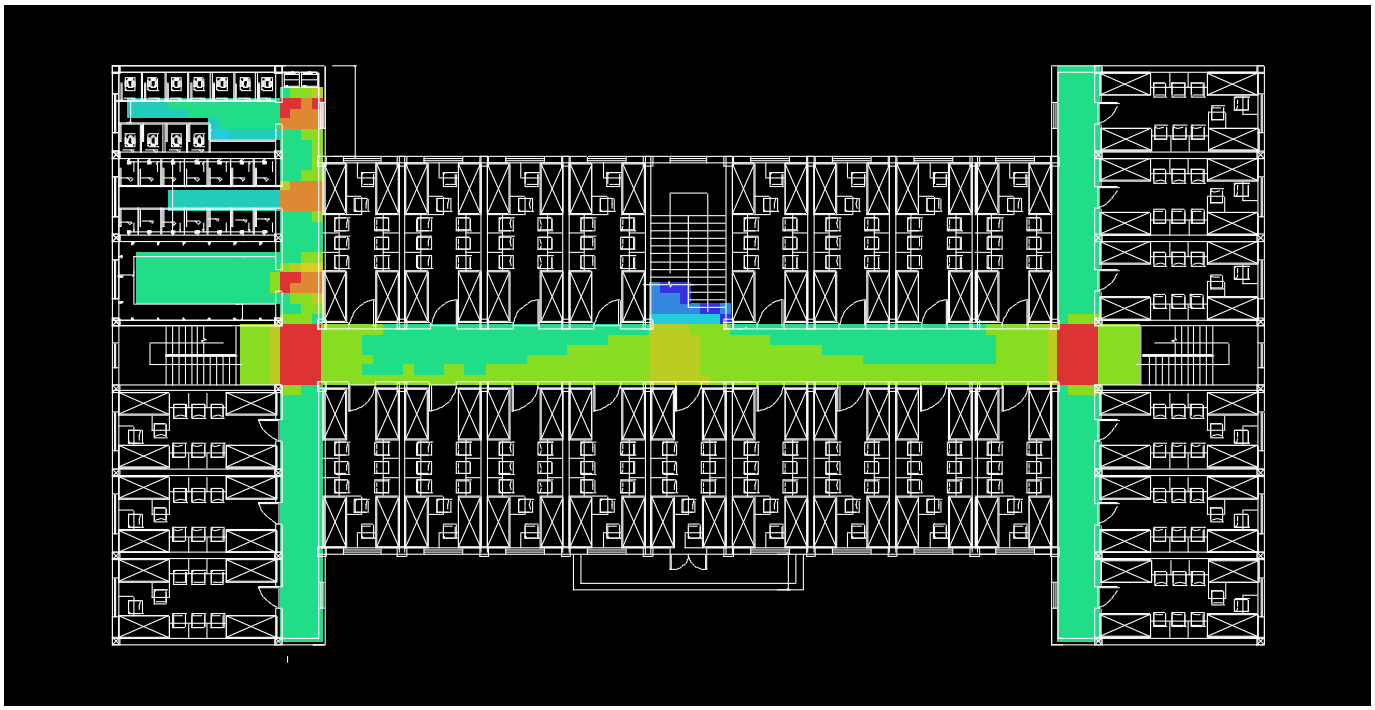


Fig. 19. Control value of the horizon of the second-floor plan. (Image Source: Drawn by the Author)

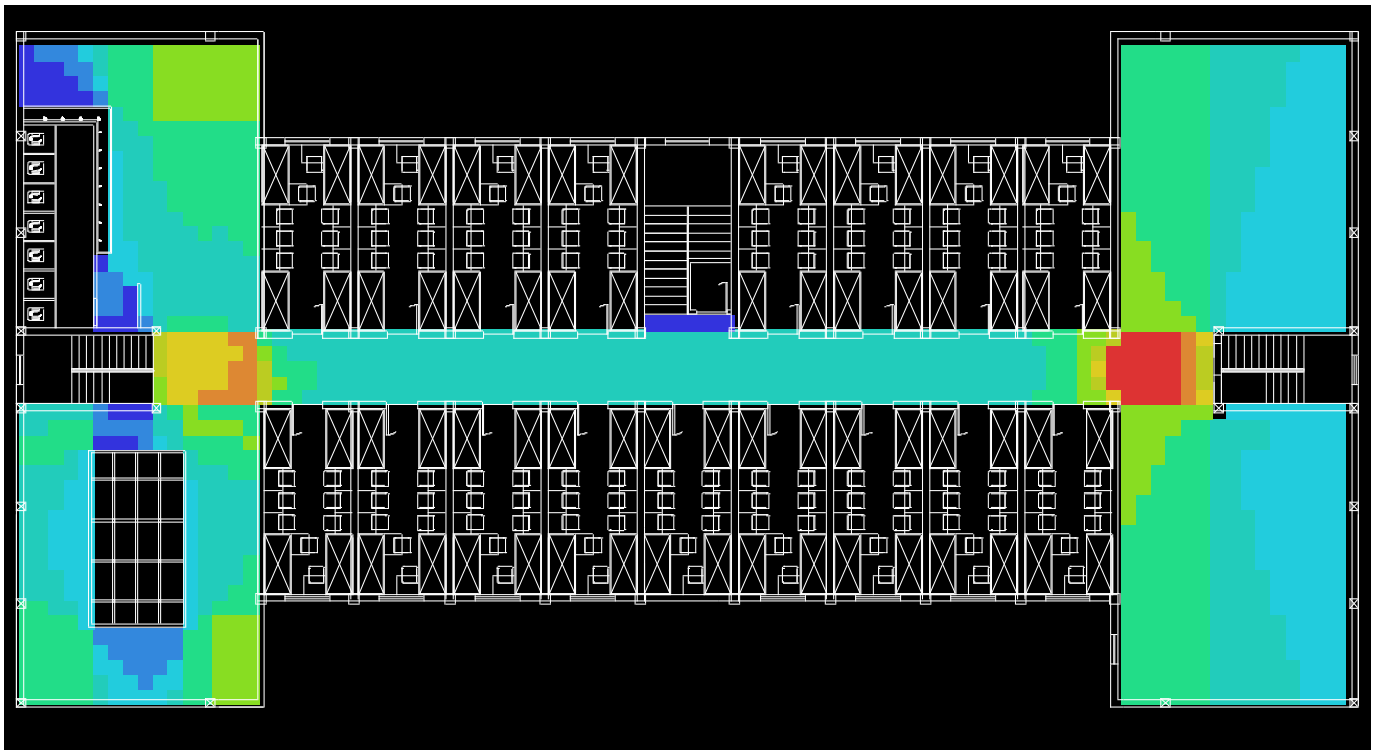


Fig. 20. Control value of the horizon of the third-floor plan. (Image Source: Drawn by the Author)

For corridors with high connection value, agglomeration coefficient, and integration of horizons, in the study of architectural narrative spatial memory, the focus should be on the "development" of this area. Through the movement of people in space, these static walls, ceilings and The ground have a feeling of movement, or it creates an interactive relationship with people. After people

walk from a straight road to a corner position, they walk from a horizontal corridor to a vertical corridor, from the corridor to the toilet, laundry, and from the first floor. After going up the stairs, go up to the second floor through the corner platform and finally out from the third floor to the top platform. The perspective is constantly transformed. This continuously transformed perspective will produce a visual and narrative change in the different elements of the dormitory. Stream-line. In terms of indoor and outdoor design, as far as interior design is concerned, different walls on different floors should be affixed with display panels to narrate the development history of the dormitory. People will create their own stories from the scenes of these narrative fragments and paste different ones. In the ages, students once held group photos of various activities in every corner of the campus and inside the dormitory. Students who came to visit their alma mater could see their own photos and recalled the “sweet and sour” experience with classmates and teachers at SCAU University. Bitterness". In the choice of wall materials, retro materials can be used, and the colour is similar to that of the facade to achieve the effect of harmony and unity inside and outside. In the choice of colour, the "warm colour" that attracts people's attention can be adopted to achieve the purpose of "narrative". The places with the highest control value of the visual field are also distributed on the left side of the first and second floors, namely the area outside the door of the laundry room, shower room and toilet. In the study of architectural narrative spatial memory, the facades of the three spaces should be updated, To strengthen the logo outside the door. On the wall leading to the left of the three areas, the arrow of the logo can be used to enhance the direction and purpose of people leading here. The choice of bricks in the lower part is more "conspicuous" in design, and related dormitory history panels can be pasted to enhance the narrative effect of the space in the area and enhance people's perception.

The view control value and the view connection value of the middle horizontal corridor and vertical corridor are ranked second and third in the entire space system. In the future wall update, the materials of the walls on both sides of the corridor and the dormitory door The colour should be considered from people's preferences, and the refurbishment of the wall enhances the memory of the narrative space of the building, so that students can recall the bits and pieces that happened in the dormitory when they come back to school.

The areas with the lowest control value and connection value are shower rooms, toilets and laundry rooms. This type of space is mainly used as a wet space to solve some private washing problems of students. It forms a strong contrast with the remaining dry space in the building. Compared with the dormitory and the dormitory, the student dormitory and the duty dormitory have a weaker connection with the space. The degree of connection between the dormitory and the dormitory is embodied in the mutual "door-to-door" in daily life and study. The communication between people is not only embodied in the material level but also embodied in the spiritual aspect so that the relationship between neighbours is better. Therefore, in the future updates, The connecting walls, ceilings and floors outside the dormitory can be designed to give full play to the "spirit of the place" so that the returning students can recall memories of the past while passing through the dormitory, thereby enhancing the memory of the space.

4.5Visual in-depth analysis of Wushan dormitory

The visual depth represents the accessibility between an element and other elements in an open space. The total number of times the line of sight needs to be turned. The lower the visual depth value, the less the line of sight in this space can see the space system. The more elements in, the more it can attract people's attention in this direction, and vice versa, it is not easy to attract people's attention. The analysis reflects the relevant characteristics of the public space of Wushan Dormitory. From Figures 21 to 22, we can see that the highest depth of view is at the junction of the vertical corridor on the left and the horizontal corridor, which is the position of the entrance of the stairs on the left, followed by the entrance of the stairs on the right. The areas on both sides are at the corners of the plane. It is accessible in all directions, so the scope of observation is the widest in the entire space system, and other elements in the space system can be seen without a great turn of sight.

Although there is an external platform on the left and right sides of the three-story plane, the area with the highest visual depth is still the position of the stairs on the left and right sides (Figure 21). The right platform is not like the left platform. There are drying racks on the south side and toilets on the north side, so the line of sight is not blocked more and more elements can be seen. In the platform on the right, the control value of the field of view is gradually increased from right to left because the stairs on the right are used as fire-fighting stairs. The floor height of the dormitory is the same as that of the first and second floors.

The second is the area of the middle horizontal corridor. This area has a larger depth. Compared with the vertical corridors on the left and right sides, the colour is darker. When observing, students can observe the doors and front of the dormitories on the left and right sides at a glance without turning—entrance and steps of stairs. Therefore, the more it can attract people's attention. There are more elements to be observed. The areas with greater visual depth are located in the toilets and showers, the promenade at the entrance on the first floor and the laundry room. This area is an internal space with a strong closedness, so the observed elements are few. The only observable elements in the corridor at the entrance on the first floor are the stairs in front and the walls

on both sides. Until people reach the junction of the horizontal corridor and the vertical corridor in the middle, the feeling of "suddenly enlightened" is felt. At the same time, the colour deepens and observes. The range of elements is larger.

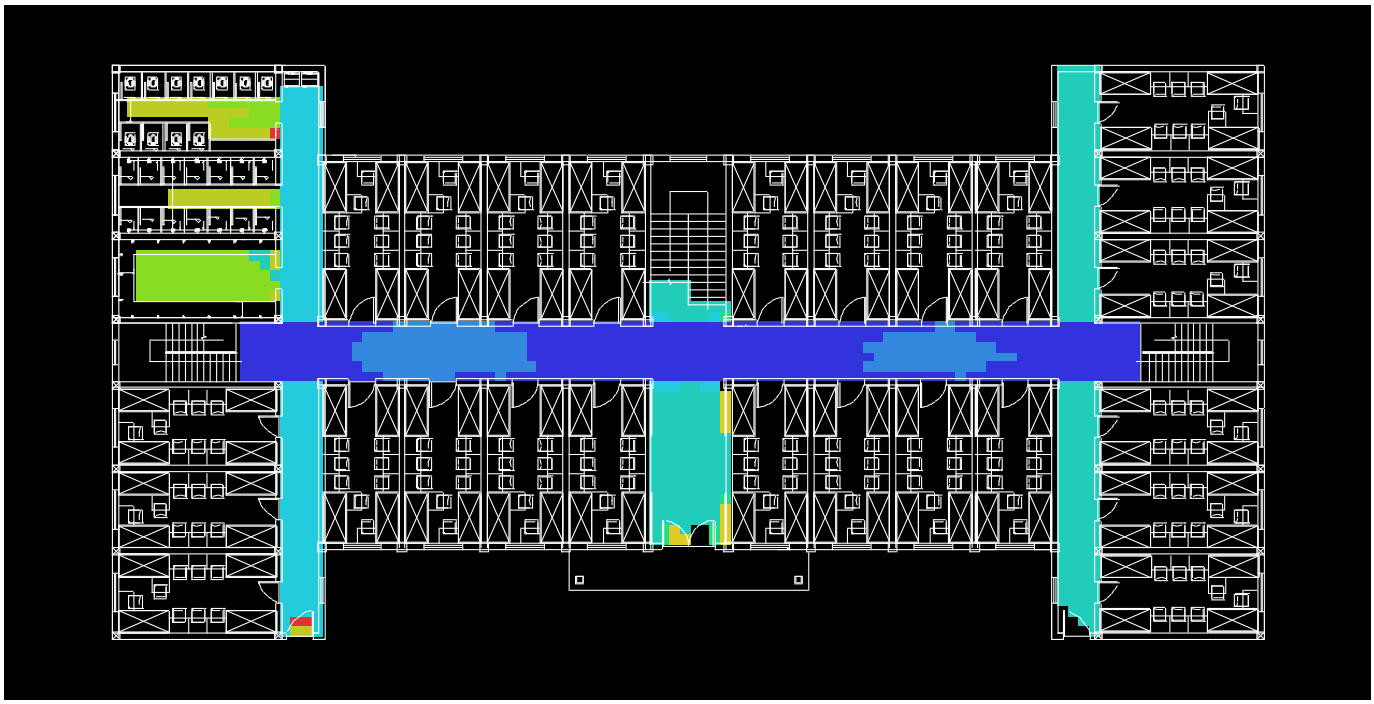


Fig. 21. Visual depth of first-floor plan. (Image Source: Drawn by the Author)

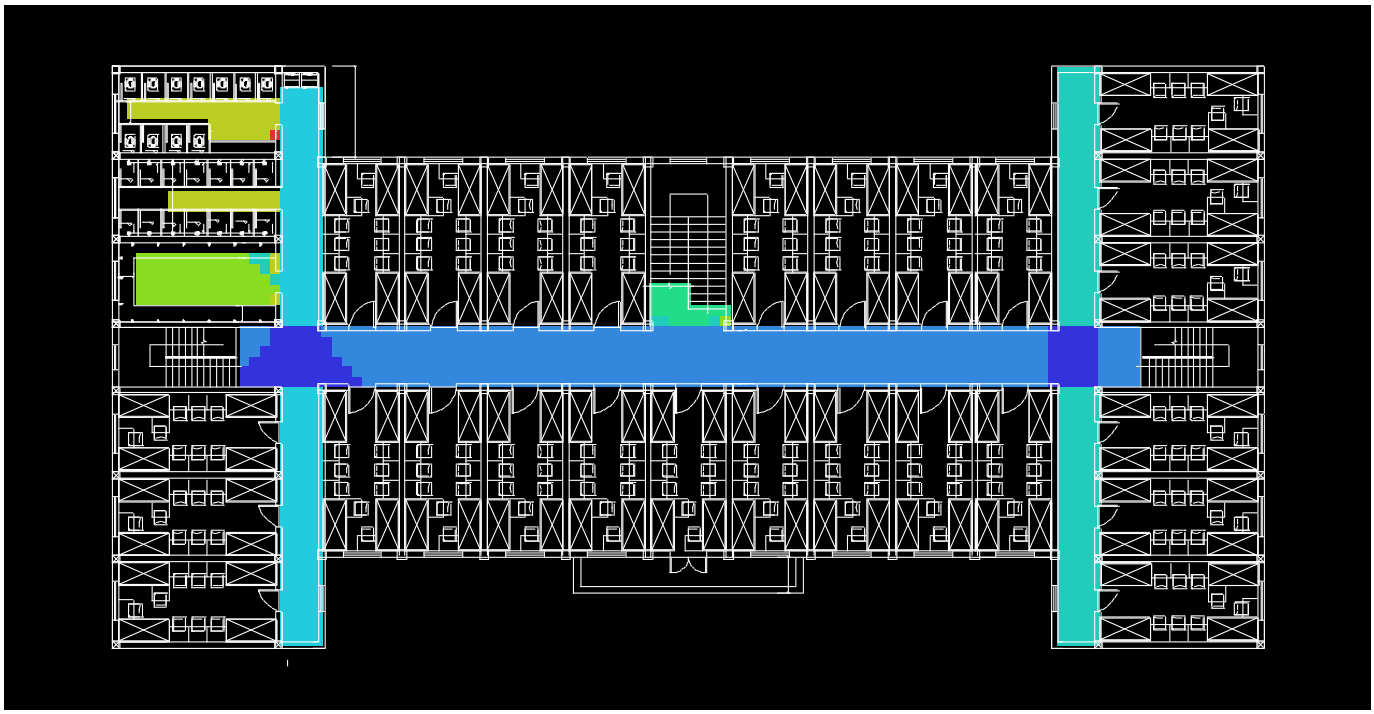


Fig. 22. Visual depth of second-floor plan. (Image Source: Drawn by the Author)

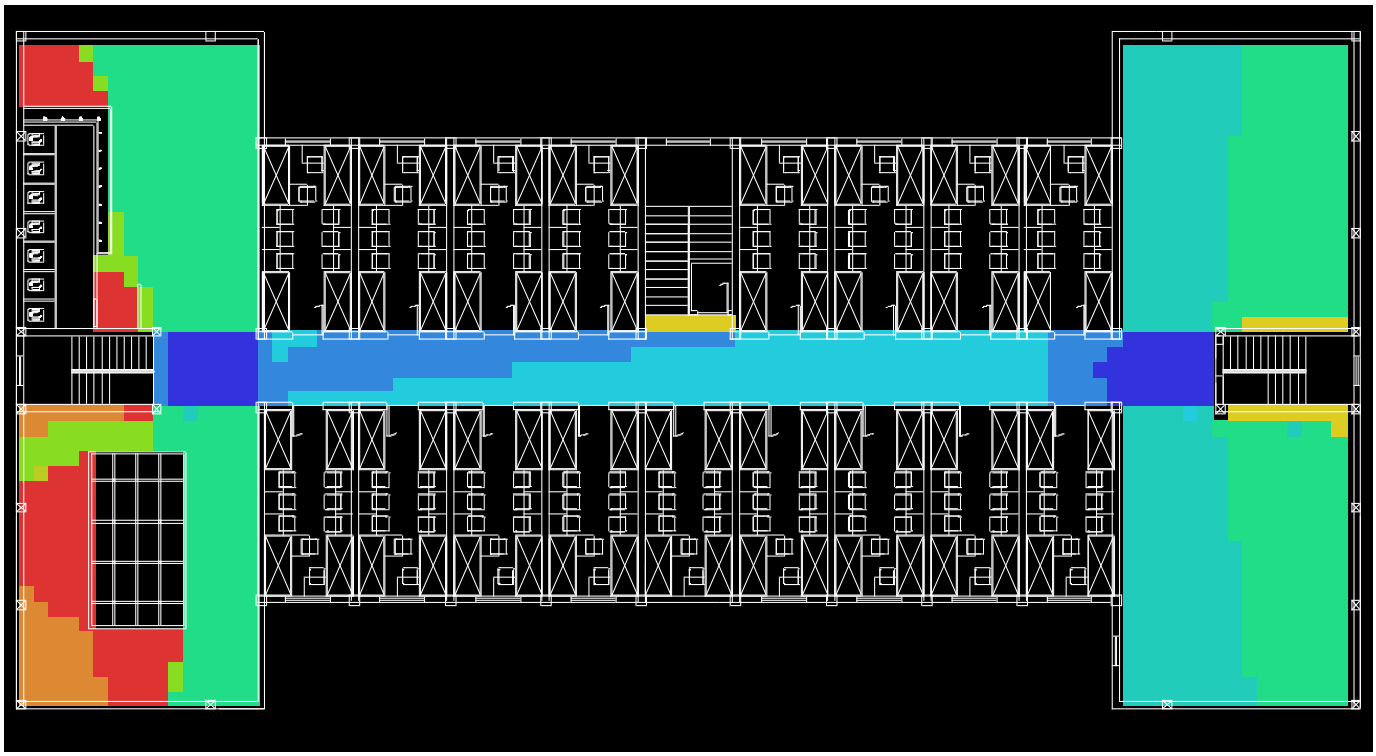


Fig. 23. Visual depth of the third-floor plan. (Image Source: Drawn by the Author)

Behavioural perception is the first impression that affects people's mood swings in the display design. When students who have graduated return to school to visit and people who come to visit because of their interests enter the Wushan dormitory, a movie begins. These two types of people The "mission" they carry is different, and the feelings they have towards the dormitory are also different. One type is once memorable but now comes back to find the "original intention", and the other is non-memory, and the dormitory has its memory through visiting. Therefore, the design needs to take care of the feelings of different people and deepen the impression of different types of people. If the impression is just right, it can make people feel novel, satisfy people's curiosity, seize people's requirements, and attract the audience like a magnet. At the present stage of the dormitory, through the quantitative analysis of the space syntax, the result of the higher visual field control value and the lower visual depth is generated. At the entrance of the dormitory, the repair and update of the facade are particularly important, which should reflect the SCAU University. The spirit of study style and the humanistic spirit of the dormitory, the exhibition board on the entrance corridor, should show the important buildings and landscapes of SCAU University. Moving forward should introduce the development process of the humanities and history of SCAU University, causing people's "emotional fluctuations." In the design and veneer materials for the walls of a horizontal and two vertical corridors at the back, the colour of the material should reflect the spirit of "Red Man Hall" of SCAU University. The graduation photos and live photos of the students at this stage bring people closer to SCAU University, remind students of the past, and let foreign visitors feel the joy of their student days.

5. Conclusion

The campus building is a space closely related to the students' study stage and daily life. It is public but also has a certain degree of privacy. The dormitory building plays a huge role in the narrative space in the student's time. Aiming at the existing space of the dormitory building, it uses space syntax technical analysis results in further psychological space, activity space, and story space:

(1) The high-traffic areas of the dormitories on the first to third floors of the dormitory building are concentrated in the middle horizontal corridor area; that is, the number of paths passed is the most. In the subsequent update design, attention should be paid to the accessibility of the space and the continuity of the viewing corridor, and further, Improve the quality of the interior of the space.

(2) The area with the strongest visual integration is at the junction of the horizontal and vertical corridors on the left side of the dormitory building, where more people will gather. In the subsequent use of space, you can consider placing class notices and dormitory important Activities such as notifications and club publicity functions to give play to the activity and functional characteristics of the narrative space.

(3) Through the analysis of the agglomeration coefficient of the horizon, we can know the daily activities of the students in the dormitory building. For historic buildings, they can be updated, protected and routinely maintained. At the same time, the area of the external platform on the third floor has a wider field of vision, and the follow-up can be considered for specific and managed gathering activities.
(4) In the first to third floors, the area with the highest view control value is at the junction of the horizontal corridors and vertical corridors on the east and west sides. It is also the area with the highest view connection value. In the space design improvement, we can consider the bright colours and highlight the visual The marking material of the effect shall be distinguished by posting. The areas with the lowest control value and connection value are wet spaces such as showers, toilets, and laundry rooms, which are mainly for daily personal privacy activities but have certain safety risks. We can consider adding public safety equipment SOS call buttons, further improving the safety performance of historical buildings in use.
(5) The place with the highest depth of view is at the junction of the left vertical corridor and the horizontal corridor, that is, the entrance of the stairs on the left. It is also the most attractive public space in the dormitory building. It can be combined with collective activities to condense collective memory becomes a narrative space.

Funding: This article is based on the research staff from 2018 to 2020 from the 2020 Guangdong Province Ordinary Universities Characteristic Innovation Project (No. 2020WTSCX286); 2019 Guangdong Province Ordinary University Philosophy and Social Science Project (No.2019GXJK131); 2018 Guangdong Province Philosophy and Social Science Planning Discipline Co-construction with the result of the paper funded by the project (No. GD18XYS40).

Conflicts of Interest: The authors declare no conflict of interest.

ORCID iD
Junzhang Chen：https://orcid.org/0000-0002-8082-9219
Yile Chen：https://orcid.org/0000-0002-8424-8059
Liang Zheng：http://orcid.org/0000-0003-3142-7704

References

[1] Lu S, and Wang B (2005). Plot: an expression of spatial memory. *Architecture Journal* (*11*):71–74
[2] Lu S. (2020). Exploration of the preservation of memory places from the local perspective. *Famous Chinese Cities*, (*7*): 4-9
[3] Lu S. (2016). The focus of this issue: protection and activation of memory places. *Modern City Research*, (*8*).
[4] Jiang T, Chen Y, Sun N, and Sun M. (2020). Research on Museum Interior Design from the Perspective of Narrative Space. Urban Architecture, (*6*):139-141.
[5] Li P, and Zhang N. (2015). On the urban narrative space and its cultural construction path. *Southeast Academic*, (5);74-79.
[6] Lu S. (2011). Urban spirit shaping strategy based on spatial events. *Urban Development Research*, (8)：120-124
[7] Lu S. (2012). A New Model of Urban Cultural Connotation and Characteristic Construction.*Journal of Shanghai Jiaotong University (Philosophy and Social Sciences Edition)*, (3):68-76
[8] Lu S. (2013). Place narrative and its exploration of urban cultural characteristics and identity construction—an example of the renewal of the above coastal water historical site.*Journal of Shanghai Jiaotong University (Philosophy and Social Sciences Edition)*, (3):51 -57
[9] Lu S, and Ma C. (2013). Research on the Coupling Strategy of Discrete Memory Places in Old City Reconstruction——Taking the Moat of Wuyuan Town, Haiyan County as an example. *Architecture Journal*, (S2):1-7.
[10] Ma K, Wang Z, and Wang S. (2021).Multi-scale analysis of traditional village spatial morphology based on spatial syntax——an example from Guanxi Community, Yushan County, Shangrao City. *Huazhong Architecture*, (4):102-105
[11] Qiu L, Zhou Y, Ni Z, Li Y, and Rao J. (2019). Research on the Narrative Space of Historic City Based on Space Syntax.*Southern Architecture*, (4):110-115
[12] Xu B, Li J, Fan X, and Yang F. (2020).Research on traditional village narrative space based on space syntax——Taking Zhangdian Village, Jiaxian County, Henan Province as an example. *Hubei Agricultural Sciences*, (3):104-107.
[13] Zhao H, and Tang Y. (2021). An overview of the evolution of contemporary "spatial narrative" theoretical research-the transformation and practice of space cognition under narratology. *Guangxi Social Sciences*, (*3*):74-81.