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THE INFLUENCE OF SOCIAL GATHERING OF COMMUNITY:

Space syntax analysis on the public space in Beijing's neighborhoods

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ABSTRACT

Community outdoor environment plays an important role in residents' gathering, however, the spatial factor is also a leading reason. This paper analyses four case areas which represent two kinds of neighborhoods in Beijing: Hutong and Mega-courtyard which composed by multi-story social housing. The research is based on the detail fieldwork mapping of social gatherings in both weekday and weekend in summer and winter of 2016-2017. It also uses space syntax as a main tool to analysis the impact of street pattern. The results show that in the summer, Hutong area can generally support more social gatherings, yet, it is different in winter. While within each type of neighborhood, comparing with the simple rules texture, the street whose topology is relatively complex can better support the social gathering, especially in Hutong area.

KEYWORDS

social gathering, public space, relevance factor, space syntax

1. INTRODUCTION

As a daily living room for urban residents, community public space plays a crucial role on promoting social interaction and enhancing community quality. In addition, community residents' gatherings and activities can mostly reflect the relationship between residents and community public space. Indeed, with the social networking platform and the smartphone widely used in urban, more and more communication transfers to the virtual network platform. However, daily social activities in public space are still an essential part in the life of community residents. For architecture and city designer, how to fully tap the community public space to support outdoor social gathering, promote spontaneous social gatherings reasonably and enhance the quality of public space have been the focus of study.

In the field of theoretical research, the relationship between social gathering and space environment characteristics is a basic topic of environment-behavior study. Jan Gehl has classified outdoor space activities into three types: necessity, spontaneity, and social activity. This paper focuses on the study of spontaneous social gathering. In the recent ten years, researchers of environmental behavior have accumulated a large amount of basic empirical research. Jan Gehl and Whyte pointing out that most social activities depend on the quality

of outdoor public space. They believe that the sun, greening, infrastructure, road width and pavement and the like, affect residents' social gathering (Jan ;1987& Whyte;1980) and based on these findings some people have some further analyses (Zacharias,2001; Liu,2015). Most of these studies have confirmed that environment quality has impact on the social gathering.

While the social gatherings of residents are often part of their long-distance travel, and many empirical studies only focus on how the "local" spatial elements impact the gathering behaviour. In the field of research, lacking of the analysis between the spatial logic and the social gathering. Hanson hold that it is basical to understanding the link of spatial organization and social life (Hanson,1989). For the spatial analysis of social gathering, on one hand, Newman proposed the public space privacy plays a key role of the residents' sense of territory and communication. On the other hand, Dutch architects Maartin Hajer and Arnold Reijndorp put forward the concept of "threshold space". The existing research is an indispensable part of the analysis, but at this stage lack of the study of analysis methods.

Space syntax, as a spatial theory and analysis tool based on topological connection, has been widely used in quantitative researches of urban traffic, land use and interior space shape of buildings for many years. In the field of social gathering, someone has applied the axis and perspective analysis tool to conduct an empirical study on the company employees and urban superblocks (Allan,1977; Manuela,2015). What's more, Trova analysis the cases of street social gathering and the conclusions are mostly confirmed that the social gathering has a similar spatial pattern with the crowd's flow distribution. After many years of research accumulation, spatial syntax has a considerable empirical basis research on the movement of traffic. What has been proved is space syntax model can simulate human flow movement successfully. Although the above researches have adopted qualitative and quantitative analysis method, lacking of the data collection and data filtering. Therefore, though a large scale data collection and data analysis, this paper compares the social gathering in different types of blocks in BeiJing.

2.DATA AND RESEARCH METHOD

2.1 SURVEY REGION

The neighborhoods concerned in this paper include the Hutong area which has a clear historical value, and the multi-story social housing which was built after the establishment of PRC in China. The choice of these two types of neighborhoods is mainly based on the following reasons: First of all, Hutong, as a typical street type in Beijing, although have a high historical value, rarely used for a reference in large numbers of residential transformation. It is useful for culture inheritance to study the different with other neighborhoods. And then, from the heighborhood type, the stree type of Hutong has a obvious distinction with the modern multi-story social housing. The differences can compare the two types neighborhoods usefully.

Therefore, this paper chooses four typical examples of the above two types neighborhoods:

Dashilan, Baitassi, Rendinghu and Baiwanzhuang, as shown in Figure 1,below. Dashilan and Baitassi are traditional Hutong area in Beijing, low population density, and courtyard buildings. While, Baiwanzhuang area and Rendinghu area are Mage-courtyard housing. Baiwanzhuang area has richful residential districts, which makes a clearly constrast. comparing with Baiwanzhuang, the district typr of Rendinghu are more similar.
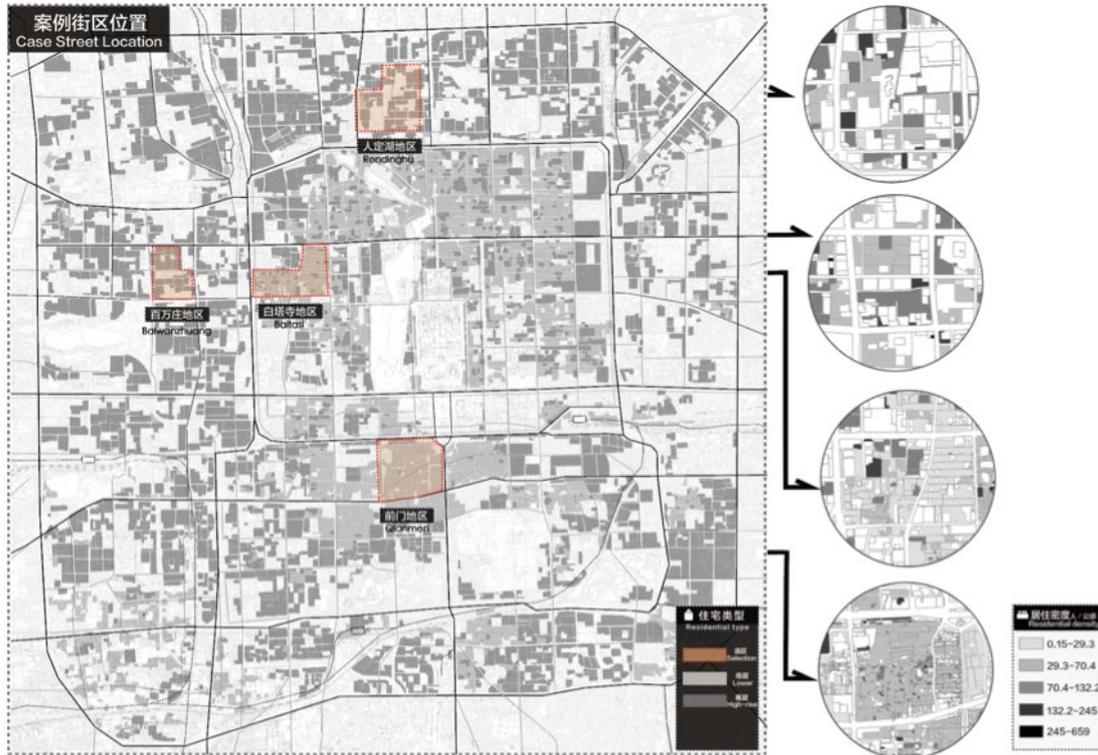
Figure 1 - Case location and residential density

2.2 RESEARCH METHOD

This study mainly by the methods of behavior note and photographic technique to obtain the data of the four cases. In order to weaken the influence of accidental factors, this study recorded the social gatherings in four time periods (8: 00-9: 00, 10: 00-11: 00, 14: 00-15: 00, 16: 00) -17: 00). Particularly, this study eliminates the necessary gatherings in the records, such as street cleaners, Traders, shop clerks, and people waiting for the bus. After the data disposed, only the spontaneous social gatherings are analysed. However, with the long-term outdoor works in local area, shop clerks and toilet cleaners who are familiar with the surrounding residents are already become a catalyst for the local social gatherings. Therefore, in this study, figure 2, as below shows the data of outdoor gathering is divided into two categories: the "net" gathering which means only the local residents' social gathering and the data both workers and residents are included which can be use to analyse the support of commerce.

Based on the methods as above, this study recorded 2037 social gathering locations in the four case areas in summer of 2016 with a total of 6101 resident and 450 social gathering locations in winter of 2016-2017 with 1931 residents were totally recorded.
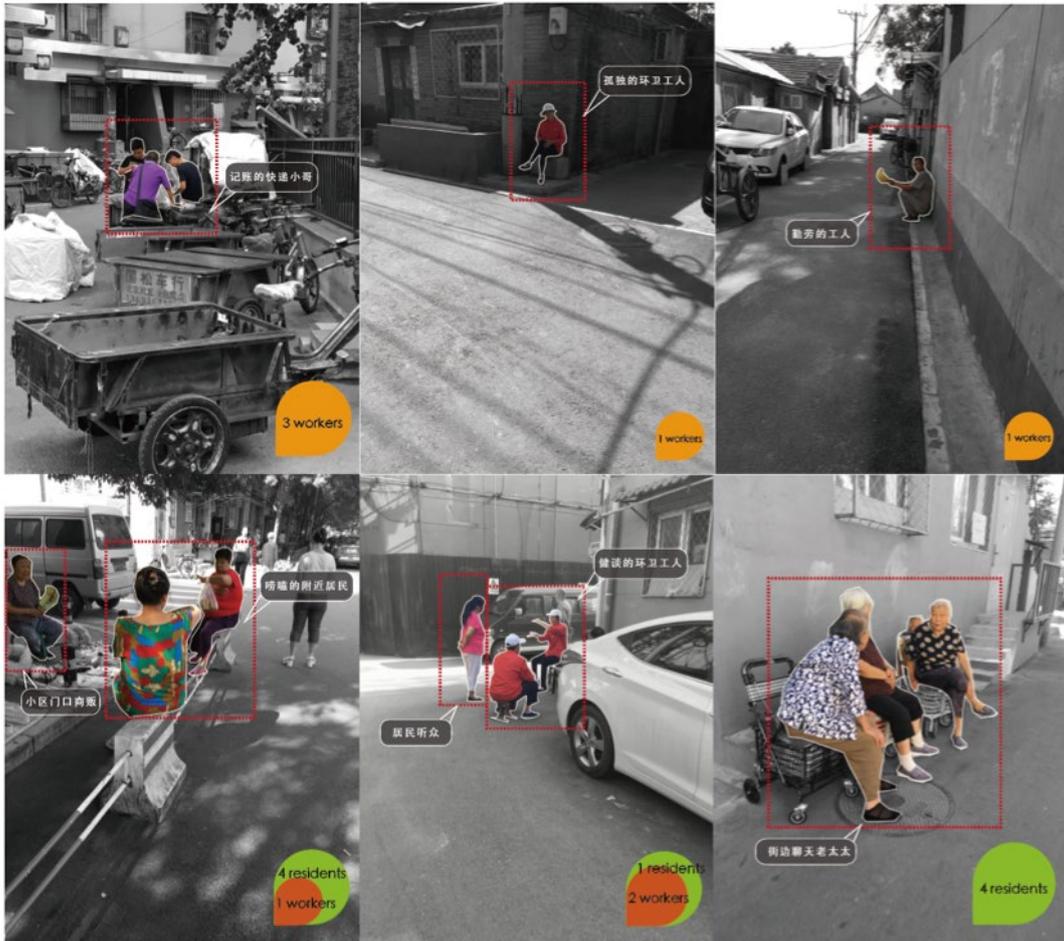
Figure 2 - Data classification method

2.3 ARRANGEMENT OF NON - RELEVANCE SPATIAL FACTOR OF NEIGHBORHOOD

According to the street form and residential type, the four case areas are divided into 20 small blocks to record the activities of residential activities, shown as Figure3, as below. Based on the number of residents, block size, street length and the social gatherings of each small block, calculating the social gathering proportion, the number of gathering of unitized area, and the number of gathering of nitized length to compare the spatial vitality of each block.
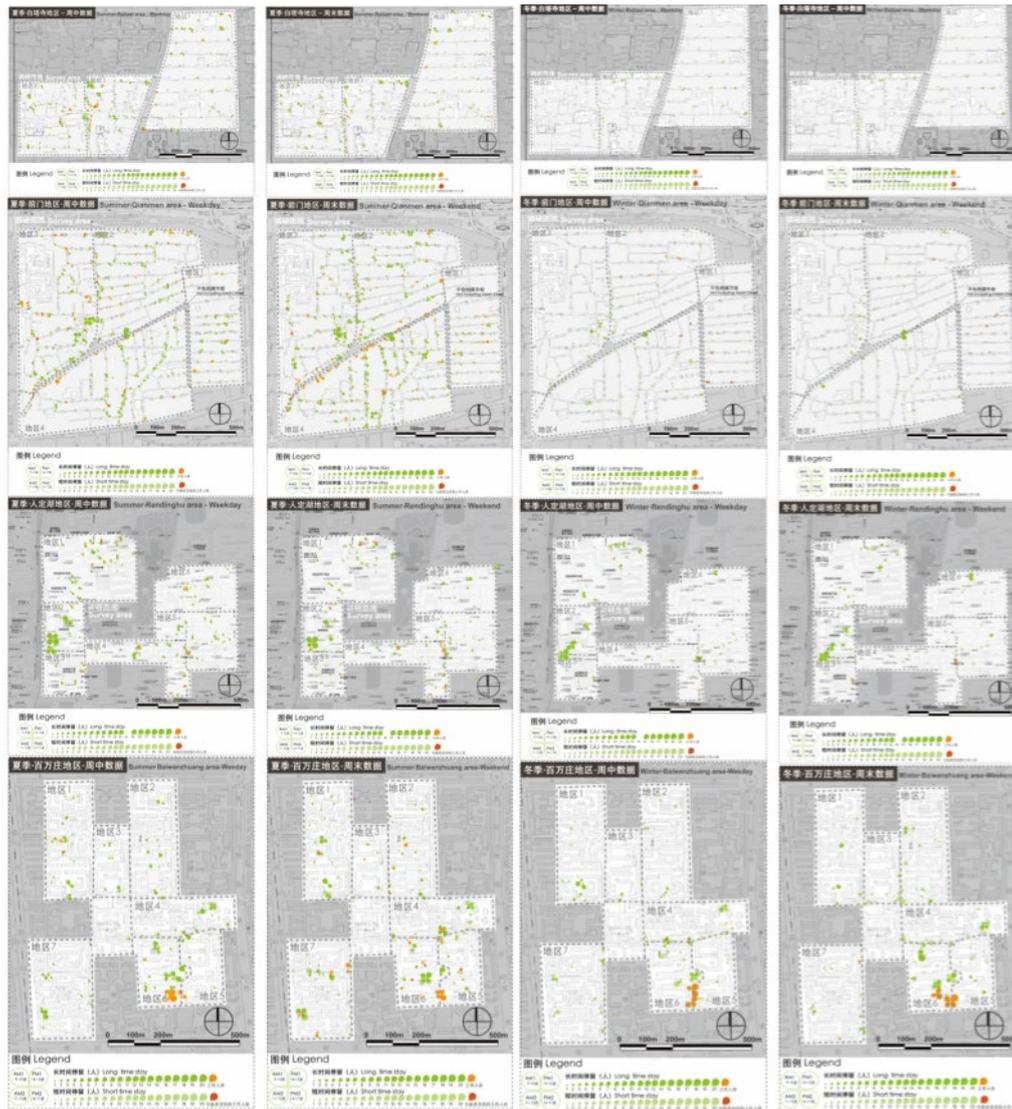
Figure 3 - social gathering in the neighborhoods

2.4 ANALYSIS OF RELEVANCE SPATIAL FACTORS OF NEIGHBORHOOD

According to the structure of urban road network, a detailed segment map model of space syntax is established by using depthmap. The meaning of the integration is to compute the shortest topological distance (defined as an integrated turn angle) of a line segment to all other segments within a certain geometric distance reachable range, which reflects the centrality of the line segment to other line segments. The choice is the number of times that a line segment is traversed by the shortest topological path between all other two segments in a certain geometric distance reachable range (also defined as an integrated pivot angle). Based on these two basic parameter, by the end of 2012, Hillier, Yang Tao and Turner put forward the normalized angular choice (abbreviated NACH) and normalized angular integration (abbreviated NAIN). By using the two parameters, the influence of the number of segments can eliminate, which makes the comparison of the different scales and complex degrees come true.

In this research, spatial syntax tools are used to analyse the influence of outdoor spatial factors on social gathering. Firstly, in the scale of the four case areas, with the weighted statistical, NACH and integration are used to macroscopic study the distribution of social gatherings in the four case areas.

Secondly, in the scale of each area, NAIN and NACH are used to analyze the impact of street texture and accessibility on the social gatherings.

3. ANALYSIS OF NON - RELEVANCE SPATIAL FACTORS

Figure 4,as below, shows the analysis of the number of residents, block size, street length and the social gatherings of each small block. It can be seen that the number of residents and the number of social gathering are more relevant. Therefore, further research is focused on the social gathering proportion as the criteria of the outdoor public space activity.
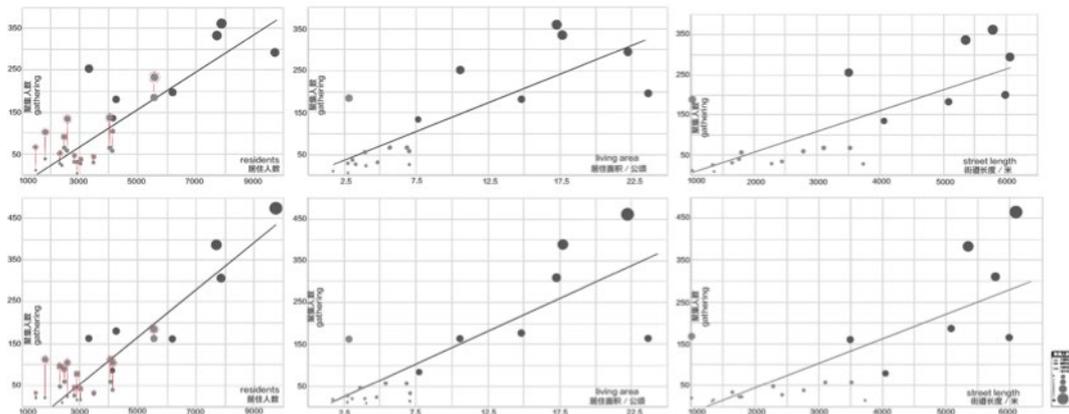

Figure 4- Non-relevance factors and social gatherings the correlation degree

Figure 5, as below, by comparing the social gathering proportion of Hutong area and Mega-courtyard area both in summer and winter, it is can be found that the the social gathering proportion in summer is higher than winter. What is more, the social gathering proportion of Hutong area is more than Mage-courtyard area. Whilst, in winter, it is opposite. The reason for this phenomenon maybe that the social gatherings in public space in summer are more about outdoor behaviour in both neighbours and the residents' activities are more widely. either of Hutong area or Mega-courtyard area can support the social gathering effectively. In winter, more activities happen indoor but in the Mage-courtyard area, each the courtyard district paly the role of "living room".
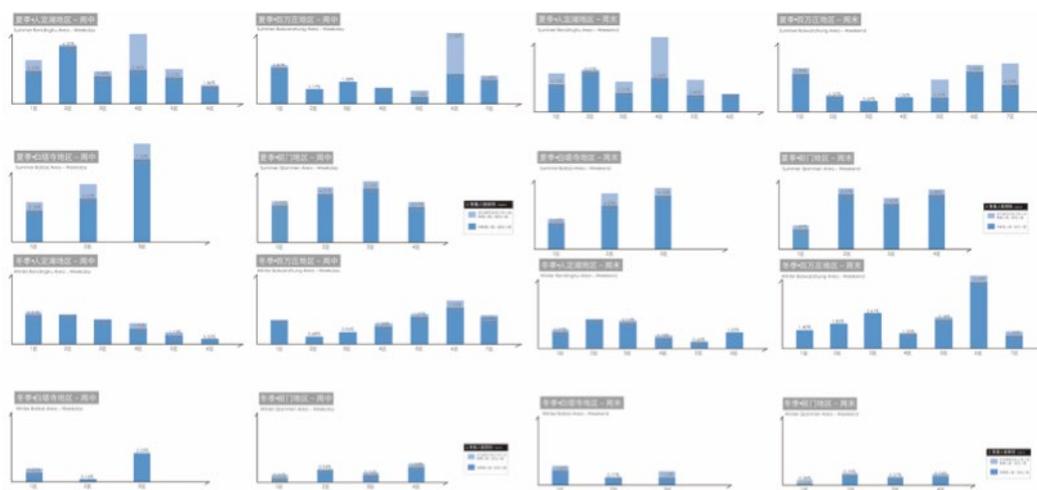

Figure 5 - The proportion of the number of social gathering

A future analysis of social gathering of the 20 small blocks in summer, the social gathering proportion of block 2 of Rendinghu area is high, for the reason that the block is high-rise residential which has a higher use of the public space. Yet, the block 4 of Baiwanzhuang is also high-rise residential which has a low proportion. Base on the survey, the block provides less public space and service facility. The block 4 of Rendinghu area and block 6 of Baiwanzhuang are high because of the commercial effect as shown figure6. It is also found in block 2 and 3 of Baitasi, which are higher than block 1. Through the comparison of the small blocks in winter, what we can see is that the blocks which have more businesses do not enhance the social gathering in public space, especially in block 2 and 3 of Baitasi.

The block 6 and 7 have more gathering proportion than in summer when compare with other block in Baiwanzhuang.

Figure 6 - The distribution of commerce in neighborhoods

4. ANALYSIS RELEVANCE SPATIAL FACTOE

4.1 LARGE SCALE SPATIAL ANALYSIS: ANALYSIS OF INTEGRATION AND NACH OF HUTONG AND MEGA-COURTYARD NEIGHBORHOODS

According to the results of spatial analysis in the previous sections, this part will analysis the spatial factors on social gatherings. In this section, the social gatherings of the four case areas are divided into six levels by the number of resident to observe the spatial parameters of the gathering groups. Figure 7,as below, shows the weighted statistical of the areas. It means the relationship between the spatial parameter (integration and NACH)of the gathering groups and the spatial parameter of whole Beijing.The comparison shows that the radius of outdoor activities of Mage-courtyard area is small, as figure8 shows more red lines in this area. From the results of NACH (eliminate the impact of the number of segments), in both types area, the social gatherings are more rely on the spaces which have higher parameter of NACH of small radius. However, the Mage-courtyard area is higher. What this means is that the social gathering public spaces of Baiwanzhuang and Rendinghu area are more outward. Due to the outward space (high value street of large radius of integration) of Qianmen and Baitasi area are occupied by urban businesses, social gathering has to be more in-depth of the district.
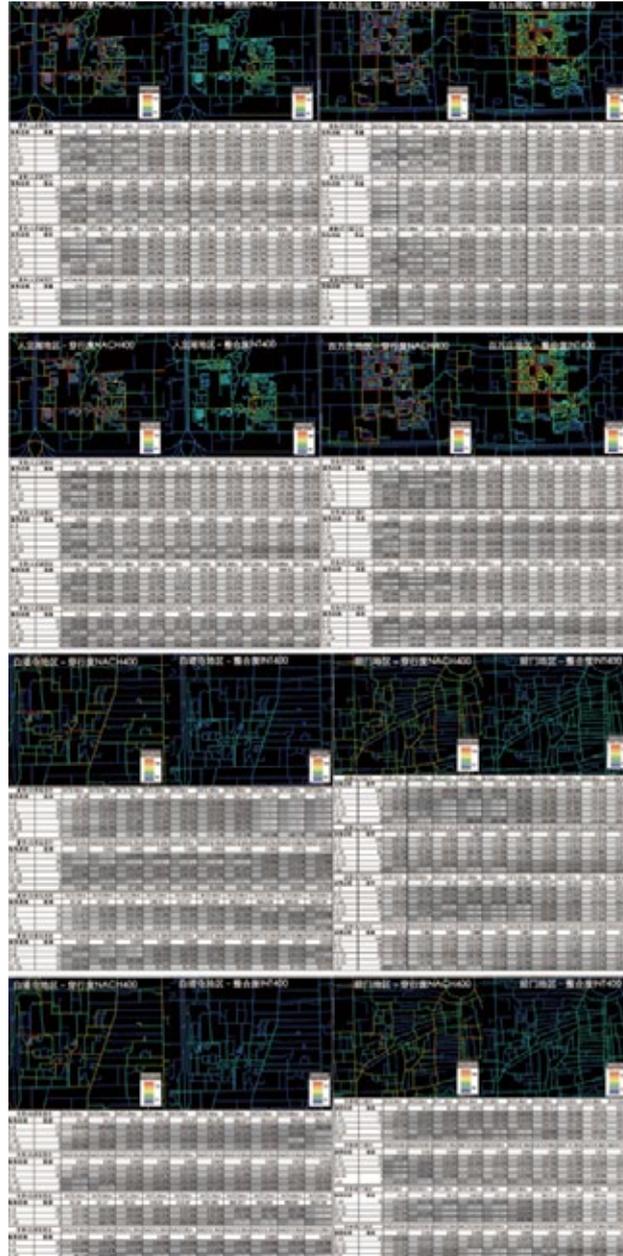
Figure 7 - Analysis of integration and NACH of each heighborhood

4.2 SMALL SCALE SPATIAL ANALYSIS: ANALYSIS OF NAIN OF THE FOUR CASE AREAS

Figure 8 shows the parameters analysis of the standardization of the integration in these four cases, which is excluded from the integration of the degree of precision (as the number of segments), and more effective measurement of the complexity of the road texture.

In the picture, each area marked all the streets 800 meters radius of the average value of the NAIN parameter. In summer, though research of the four cases, the data shows the block which street texture more complex and the value of NAIN relatively lower, has effective support of resident social gatherings. In winter, this phenomenon is more evident in the Mega-courtyard area which seems like a small mixed area compare with the four case areas.This preliminary finding suggests that the value of street texture is not a simple linear relationship with social gathering. In a certain range, it is easy to promote the community communication. If the value is too high, it will be weakened.
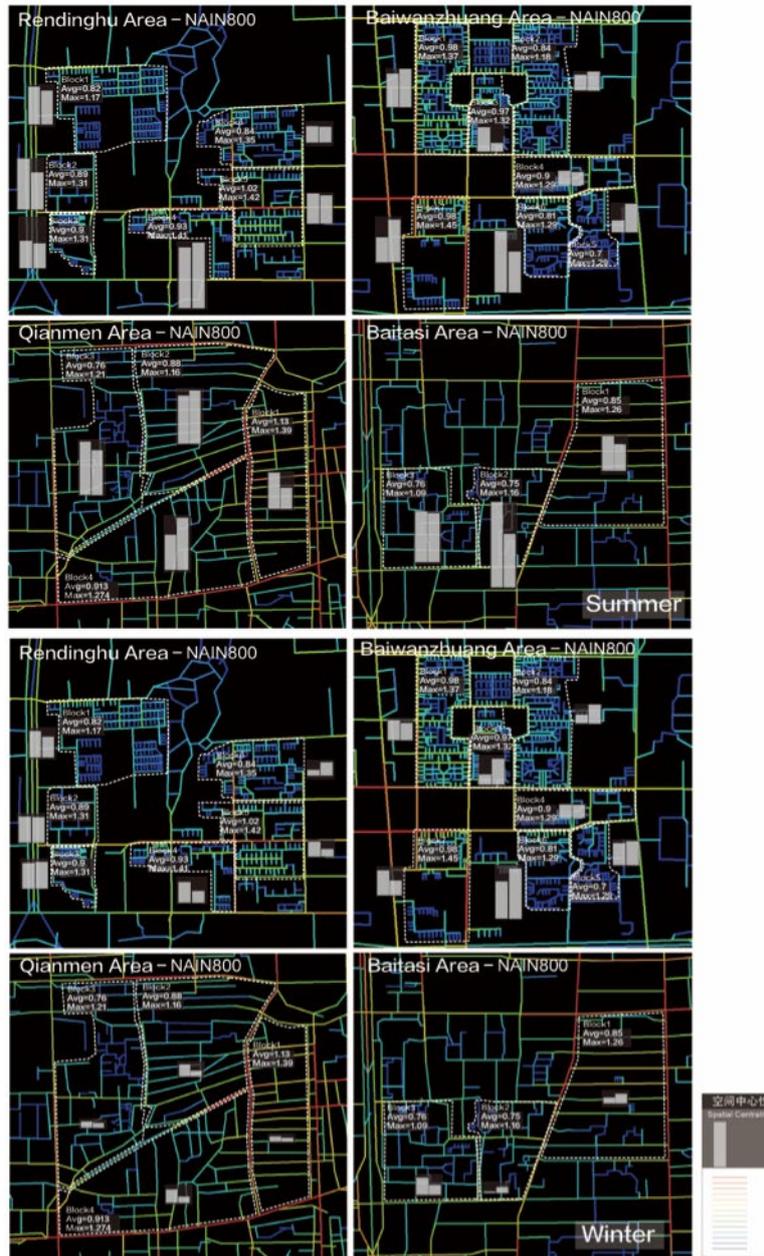
Figure 8 - Analysis of NAIN of each block

5. CONCLUSION AND DISCUSSION: ANALYSIS OF THE DYNAMIC AND COMMUNICATION MODEL OF THE NEIGHBORHOODS

Through the research and analysis of the statistical data of the four cases in summer and winter, the influence of public spaces on resident social gatherings is summarized the following points:

According to the field investigation of the four case heighborhoods of Beijing Hutong and Mega-courtyard, this paper research the social gatherings in summer and winter. From the statistical data, the number of social gathering in summer is higher than winter, obviously in Hutong area. In addition, the medium gathering groups reduce sharply. In term of the promotion of the businesses, it is better in summer. From the view of spatial factor, in the large scale and smaller scale, the public spaces which street texture is relatively complex and have a better connection with the external street may have more social gatherings.

The above preliminary conclusion shows that the spatial activity maybe attracted by two aspects:

firstly, the space has a better accessibility will increase the chances of external pedestrians crossing.

Under the appropriate environmental factors, it is favourable for social gatherings. Secondly, public space gatherings are closer to the courtyard front the buildings and private spaces. In brief, it is a kind of spatial law based on the street pattern and architectural type, which means, it is necessary to provide more opportunities to meet the "right" people.

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