

Technical Note

# Perception evaluation of soundscape in a wetland community by spatial graphical representation: a case study of Hangzhou Xixi Wetland, China.

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## ABSTRACT

The perception evaluation of soundscape in a wetland community is investigated based on spatial graphical representation and statistical theory. The data were analyzed by EXCEL and SPSS and they produced the zoning map of soundscape in a wetland park. XIXI Wetland, Hangzhou, China, was chosen as the case area. The perception evaluation of soundscape was conducted at ten aspects: elements, time, preference, integration, liveliness, boisterousness, pleasure, feature, nature and irritability. Meanwhile, the goal is to provide a favorite soundscape for tourists, and a visual map with graphic reference is drawn for soundscape design in the wetland community.

## 1. Introduction

The topic of this paper is soundscape and it highlights the importance of sound in their daily lives. As a result, landscape design becomes more comprehensive and vivid, in order to abundantly satisfy the visitor's perception experience. At the same time, it can provide a more humane landscape experience for the special people such as the blind, the amblyope and substantially promote the satisfaction of wetland park visitors.

In recent years, many scholars propose that both visual impact and the other four kinds of sensory experience are presented for visitors. Therefore, the status of soundscape research is on the rise in landscape design. It has been 178 papers since the beginning of related research in 2002 and reached the peak of research in 2015. A survey of Chinese soundscape research in Fig.1. At present, the research of wetland parks are mainly about visual experience, but less about hearing experience

(soundscape research). Thus, the study of soundscape of wetland parks are provided with positive and significant significance.

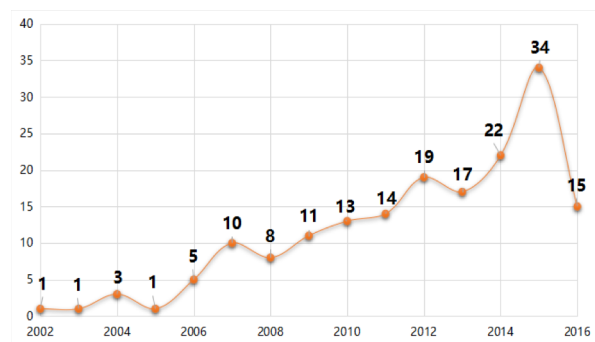


Fig.1. Trend chart of soundscape research in China

the elements of the soundscape, analyzing the soundscape of the occurrence time, making a preliminary partition of soundscape through the perception of

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perception evaluation and drawing the zoning map of soundscape.

## 2. Review of literature

The word "soundscape" derives from the concepts of sound and landscape, which is a primary content of acoustic ecology. Current research situation mainly includes following four aspects: concepts and categories of soundscape, subjective and objective evaluation of soundscape, drawing of soundscape graph and design of soundscape.

### 2.1 Concepts and categories of soundscape

Soundscape is a kind of emphasized individual or social perception and the way of understanding, which is one of the sound environments. Meanwhile, it refers to the combination of natural and man-made sound environments in the human world. Pijanowski (2011) summarized the foundational elements of a new area of research we call soundscape ecology. Su (2014) explained the psychological basis of soundscape design and the steps of soundscape design methods. Smith (2014) proposed an integrative framework which is about humanistic and policy dimensions of soundscape ecology. This framework conceptualizes the complex and dynamic relationships between humans and their acoustic environments. Barchiesi (2015) classified the audio scenes. Kang (2016) presented ten questions to systematically provide the underpinning science and practical guidance in soundscaping. Acun (2018) conducted a grounded theory survey which captures individuals' subjective response to the soundscape and created a conceptual framework.

### 2.2 Subjective and objective evaluation of soundscape

Wu (2004) discussed the sound preference by method of psychoacoustic and noise acoustics, and made an investigation on soundscape in Zijinggang Campus of Zhejiang University. Zhao (2005) defined subject and object, connotation and denotation of soundscape research, and put forward intention concepts of sound. Ge (2006) analyzed the spatial division and characteristics of the soundscape. Wang (2007) argued the research on soundscape of urban park by an experiment on subjective evaluation of soundscape elements quantifications. Ma (2008) presented the sound quality of city parks through questionnaire surveys and experiments. Then, it show that geophonies is more popular than anthrophonies. KC Lam (2010) discussed that human preference is not statistically

related to common acoustical and psychoacoustical metrics. Yue (2012) investigated that soundscape of humanities landscape of Hangzhou West Lake scenic area is chosen as research object to study acoustic characteristics from culture, form and evaluation. Rafat (2014) evaluated the preference of soundscape through a close- and open-ended format questionnaire. Hong (2015) investigated relationships between soundscapes and landscapes within various functions of space. Medvedev (2015) considered subjective appraisals of the soundscapes and examined the relationship between soundscape and physiological response. Aletta (2016) investigated how soundscape currently is assessed and measured. Krause (2016) used ecoacoustic methods to survey the impacts of climate change on biodiversity.

### 2.3 Drawings of soundscape graph

Sun (2012) used GIS system to initially establish a database of park soundscapes and a harmonic landscape map. Hu (2015) used GIS system to draw integrated soundscape map and carry out multi-directional analysis. Tian (2015) built the acoustic landscape spatial database on the ArcGIS platform. Zhang (2016) identified the subjective and objective factors of soundscape evaluation. Sercan (2017) compared subjective parameters and psychoacoustic parameters which was obtained with regards to their effects on soundscapes.

### 2.4 Design of soundscape

It is found that there are 3 problems in the current research through above research. First of all, the study focuses on noise control while ignores the auditory aesthetic. In another, the research concentrates on the analysis and ignores the visual expressions of soundscape. What's more, the design of soundscape in wetland parks is less mentioned.

## 3. Study area and Methods

### 3.1 General situation of object

In the past, XIXI was the second largest scenery in Hangzhou which has a history of more than 1000 years. Since the Tang Dynasty, it has been famous at plum, bamboo, reeds and flowers. Now, it is located in the western of Hangzhou city where less than 5 kilometers from West Lake (**Fig.2**). It is also a rare secondary wetland. At present, it is the first and only national wetland park which integrates urban wetland, farming wetland and

cultural wetland with rich ecological resources and profound culture.

After comprehensive protection, it is opened the total area of 3.46 square kilometers: the ecological protection and ecological restoration area accounted for about 94%, the historic remains protection area accounted for about 2.1% and service facilities accounted for about 3.9%. The most essential and characteristic part of the water landscape in XIXI has been completely preserved.

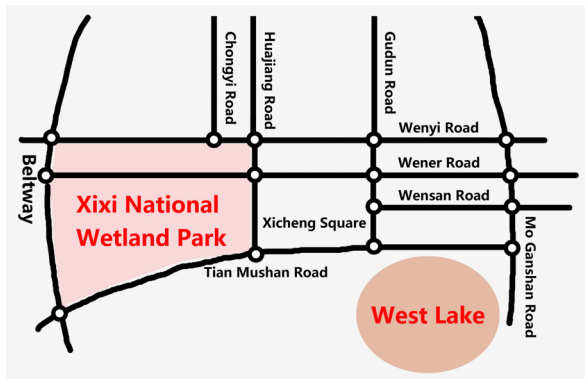


Fig.2. Location map of XIXI Wetland Park

3.2 Methods

(1) Questionnaires and Correlation coefficient analysis

A questionnaire study was conducted to inspect the perception evaluation of soundscape in XIXI Wetland Park through the semantic differences and it was conducted in May 2016. Respondents who were tourists of XIXI Wetland Park, were questioned about their appraisals of soundscape in each attractions. A total of 180 questionnaires were issued, taking back 180 copies. And the results of the survey were analyzed by correlation coefficient method to determine the relationship between preference and integration.

(2) Data analysis of questionnaires

To draw soundscape zoning map of XIXI Wetland Park, data are analyzed by the research data of questionnaires in linear regression analysis and cluster analysis through EXCEL and SPSS.

According to demands of this study, questionnaires of perception evaluation are comprised of three parts. The first part is demographic information of respondents. In the second part, preference and integration as evaluated by 22 kinds of sound elements of XIXI Wetland Park. "Reference" refers to the degree of tourists' love for each sound element, and "Integration" refers to the harmony between the sound element and the surrounding environment. In the last part, respondents were asked to

evaluate liveliness, boisterousness, pleasure, nature and irritability of attractions in study area (Fig.3).

A preference evaluation of Sound elements in this park.

|                                | (very disgusted)      | (disgusted)           | (neutral)             | (favorite)            | (very favorite)       |
|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| voice of leaf                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| voice of rain                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| chirm                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| voice of cicada                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| voice of frogs                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| voice of aquatic bird          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| voice of boat across the water | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| voice of stream                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| voice of guide interpretation  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Fig.3. Questionnaire screenshot (part)

The semantic differences is used in investigations which are used five different degrees of adjectives by respondents to estimate sound elements when they have heard. Furthermore, a rating system used in analysis of data is described and the five different degrees of adjectives is counted for each of them. Among them, the preference can count five degrees : very disgusted for -2 points , disgusted for -1 points, neutral for 0, favorite for 1 points, very favorite for 2 points and integration also can count five degrees : very discordant for -2 points, discordant for -1 points, neutral for 0, more integrate for 1 points, very integrate for 2 points (Fig.4).

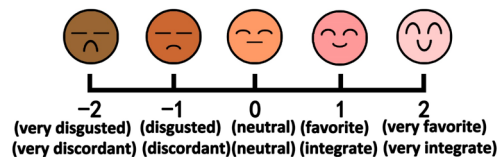


Fig.4. A sketch map of scoring method

The research data of analysis consists of three parts in this paper. First of all, we analyze the demographic information of respondents by EXCEL. Then, a linear regression analysis is considered to study the relationship between preference and integration through EXCEL. Last but not least, a cluster analysis is applied to draw a zoning map of soundscape by SPSS, combined with the analysis of preference and integration (Fig.5).

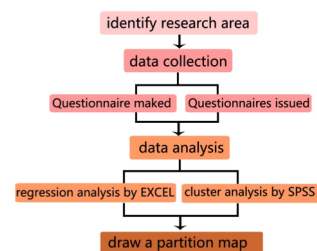


Fig.5. A study framework of soundscape



Fig.6. Soundscape of classical performance in XIXI Wetland Park

Table 1. Elements of soundscape in study area

| category of acoustic source | component element  | legend | example  |
|-----------------------------|--------------------|--------|--|
| geophonies                  | voice of wind      |        | voice of architecture and vegetation through wind  |
|                             | voice of water     |        | voice of bird through water, voice of boats across the water and voice of stream               |
| biophonies                  | voice of rain      |        | voice of vegetation, roads, water and architecture by rain                                     |
|                             | voice of animal    |        | chirm, voice of fish, voice of aquatic bird, voice of cicada and so on                         |
|                             | voice of life      |        | voice of chat, picture, dining, shopping and voice of resident life                            |
| anthrophonies               | voice of culture   |        | voice of guide interpretation, voice of stage performance, voice of Dragon Boat Race and so on |
|                             | voice of equipment |        | voice of speaker, chime, audio and mobile phone  |
|                             | traffic noise      |        | voice of motor vehicle and steam-whistle   |

Table 2. Elements of landscape in study area

| category of landscape | component element | example   |
|-----------------------|-------------------|---|
| animal                | insect            | Cicada, butterfly etc.  |
|                       | bird              | Cuckoo, oriole, egrets, magpies, swallows, wild duck etc.   |
|                       | tree              | Tea tree, persimmon tree, old camphor tree, willow, bamboo etc.   |
| vegetation            | grass             | Reeds, calamus, water bamboo, water Onion, duckweeds float, wild celery etc.                                      |
|                       | flower            | Lotus, plum, etc.   |
| architecture          | bridge            | Wen Yun bridge, De Xian bridge, Ying Chun bridge, Shi Ping bridge etc.  |
|                       | architecture      | XIXI cottage, stage, hut, Bo nunnery, Mei Zhu villa, Qiu Xue nunnery, birdwatching pavilion, exhibition hall etc. |

4. Results and analysis

4.1 Soundscape elements

According to the results of the survey, soundscape of XIXI Wetland Park contains three descriptions which are geophonies, biophonies and anthrophonies, mostly in geophonies (Table 1, Fig. 6). The geophonies are the result of sonic energy produced by nonbiological natural agents such as winds, volcanoes, and sea waves. The biophonies are the results of animal vocalizations (song, contact and alarm calls, shouts). The anthrophonies are the result of all the sounds produced by technical devices (engines, wheel revolutions, industries, etc.).

The landscape consists of water, vegetation, animals, way and structures in XIXI Wetland Park. The water mostly includes river ports, ponds, swamps, fish ponds, etc. The vegetation includes trees, flowers, grass, etc. The animals include birds, insects, fish, etc. The way includes nunneries, temples, residences, cottages, humble cottages, villas etc. The structures include bridges, pavilions and archways (Table 2), and because these elements of soundscape are universal, they can also be applied to other region.

4.2 The time

According to the results of analysis, a close relationship between time and the rhythm of visitors is proved. Before 08:00 am, the sound type is mainly based on geophonies and part of biophonies, such as chirm, voices of leaves and voices of wind in study area. In the morning, the type of sound in study area began to enrich. Then biophonies and anthrophonies have started, such as whisper, voices of frolic, voices of guide interpretations, yo-heave-ho (voices of selling), etc. At noon, the type of sound in study area is calmer than morning. In the afternoon, it is the peak hours for tourists that the type of sound is more abundant than morning, mostly about geophonies, biophonies and anthrophonies. In the evening, due to the decline in visitors, the type of sound in study area mostly in biophonies and anthrophonies is gradually reduced. In addition, geophonies are almost heard every time, becoming the background sound of soundscape in study area (Table 3).

4.3 The results of perception evaluation

(1) The demographic information of respondents

The demographic information of respondents includes gender ratio, age distribution, occupation, region, and frequency of coming the park (Fig. 7). A total of 180 respondents, 80 are male, accounting for 44.44% of the total number and 100 are female, accounting for 55.56% of the total number. The age of respondents account for 34.44% in the number of 20-40 years and 55.52% in the number of 40-60 years, showing that visitors mainly are young and middle-aged people.

The statistical results show that most of respondents come to the park at the first time, accounting for 83.33%. And most of respondents don't come from Zhejiang Province, accounting for 73.33% and illustrate that visitors go to XIXI Wetland Park mostly about mainlanders.

(2) The score of preference and integration

The preference refers to the level of favoritism toward soundscape. The integration refers to the level of harmony for sound elements which visitors heard with the surrounding environment and landscape. The preference and integration as evaluated by a sample of 22 sound elements in study area.

Five favorite sound elements for respondents is obtained by sorting the scores of the preference of 22 sound elements in study area, including chirm (1.489), voices of leaves (1.4000), voices of rain (1.322), voices of aquatic birds (1.294) and voices of stream (1.209).

These sound elements belong to geophonies and biophonies. The results show that the tourists have a favorable impression on geophonies and part of biophonies in the XIXI Wetland Park, and it also shows that the geophonies brings tourists pleasure and tourists desire the geophonies (Fig.8).

The last 5 sound elements which ranks the score are regarded as objectionable elements, comprising of noise of tourists (-0.178), yo-heave-ho (-0.300), voices of audio in business district (-0.622), traffic noise (-1.561), voices of construction (-0.672). These sound elements are part of anthrophonies (Fig.9).

Above contents explain that the tourists have a poor impression on anthrophonies and also explain that anthrophonies prompts tourists to feel the impetuous and noisy city. By comparing the data in Table 4, it can be

Table 3. Time of soundscape in study area

| time        | Sound category   |   |   |
|-------------|--|---|---|
|             | geophonies   | biophonies  | anthrophonies   |
| 06:00-08:30 | Chirm, voice of leaf and wind.                                 | Voice of conversation by staff, arrangement and clean.                  | Voice of motor vehicle.   |
| 08:00-12:00 | Chirm, voice of leaf, wind and boats across the water.         | Voice of conversation, frolic, interpretation, selling and performance. | Voice of motor vehicle, electromobile, steam-whistle, audio and broadcast.          |
| 12:00-14:00 | Chirm, voice of leaf, wind, cicada and boats across the water. | Voice of conversation, frolic, selling and performance.                 | Voice of motor vehicle, electromobile, steam-whistle, and broadcast.                |
| 14:00-17:30 | Chirm, voice of leaf, wind, fog and boats across the water.    | Voice of conversation, frolic, selling and interpretation.              | Voice of motor vehicle, electromobile, steam-whistle, audio, selling and broadcast. |

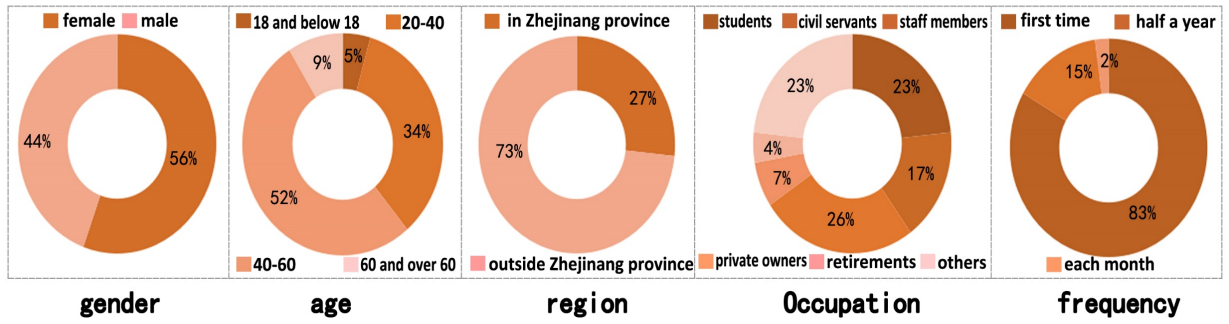


Fig. 7. Demographic information of respondents

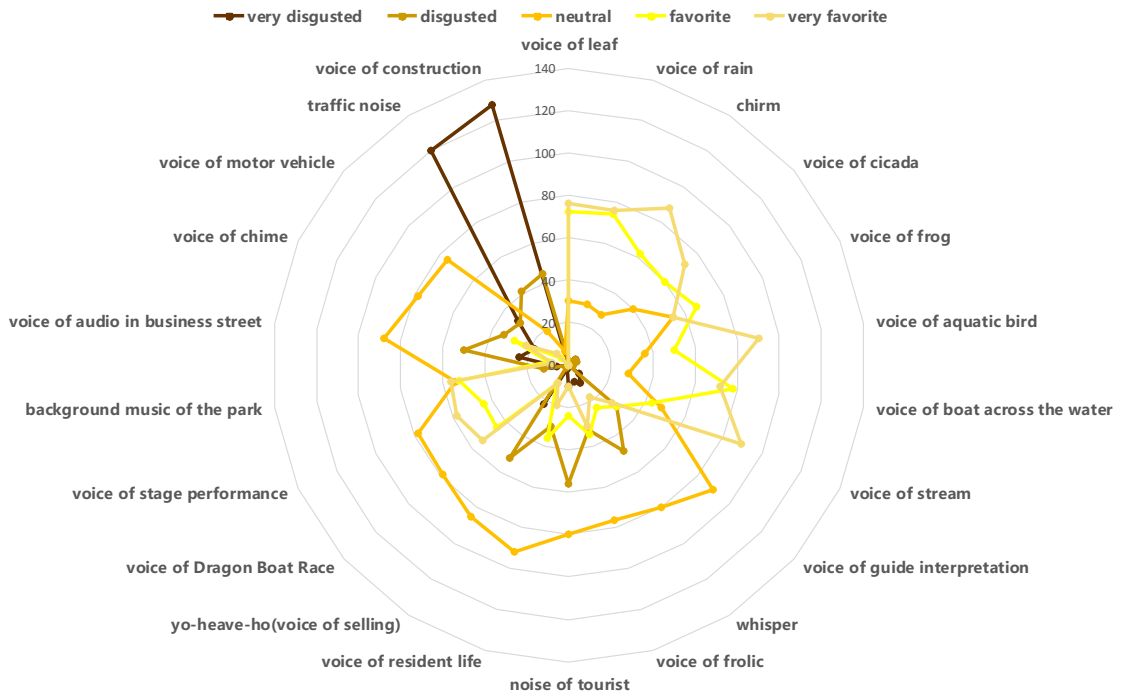


Fig. 8. Radar map of integration

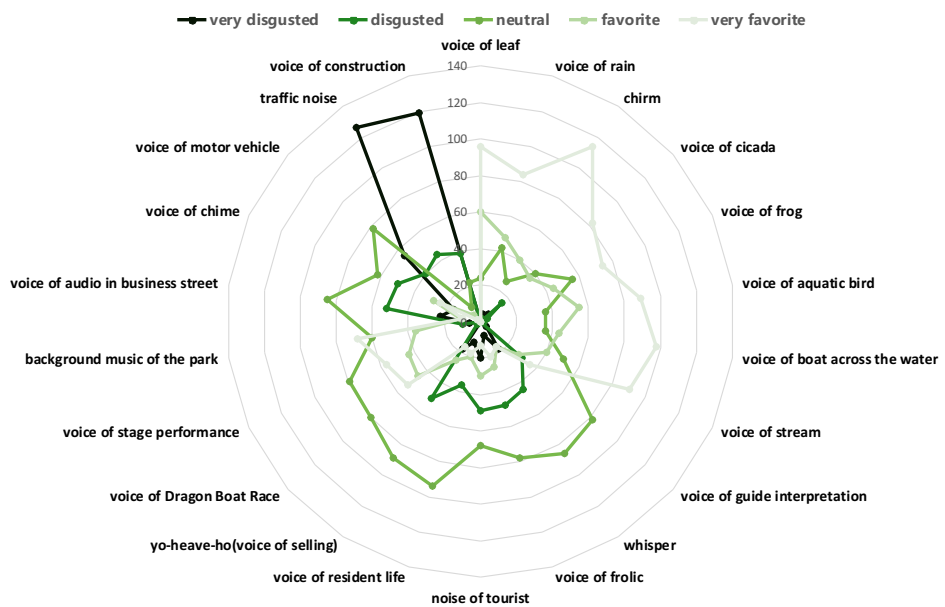


Fig. 9. Radar map of preference

voices of stream which belong to geophonies and part of biophonies, the score of integration is also higher. On the contrary, sound elements with lower score of preference, such as voices of audio in business street, traffic noise, voices of construction which belongs to anthrophonies, the score of integration is also lower. Besides, the ranking of sound elements between preference and integration is largely the same. But, individual sound elements have a dislocation in integration.

### (3) Relationship between preference and integration

A commonly used statistical method of appropriate statistical qualitative change is expressed that correlation analysis of two variables studies the linear correlation between the two variables. The correlation coefficient is a representative indication which determines variables between linear correlation degree and correlation direction. This study determines the relationship between preference and integration by the Pearson correlation coefficient, when  $|r| = 1$  called complete correlation, when the  $0 < |r| < 1$  called related, when  $r > 0$  called positive correlation, when  $r < 0$  called negative correlation.

In positive correlation, the  $r$  value is between 0 and 1, and the scatter diagram is oblique upward, when one variable increases, the other variable also increases.

In negative correlation, the  $r$  value is between -1 and 0, the scatter diagram is inclined downward, when a variable increases, the other variable will be reduced.

The absolute value of  $r$  is closer to 1, and the degree of correlation between the two variables become stronger. On the contrary, the absolute value of  $r$  is closer to 0 and the correlation of the two variables become weaker. After calculation analysis, the  $r = 0.9947$  is very close to 1 (**Fig.10**). And the relationship between the two variables which are preference and integration is highly positive correlation by the result of  $r$  value and scatter diagram. The results present a very close relationship between preference and integration of soundscape. It also shows that the soundscape is an indivisible part of the landscape.

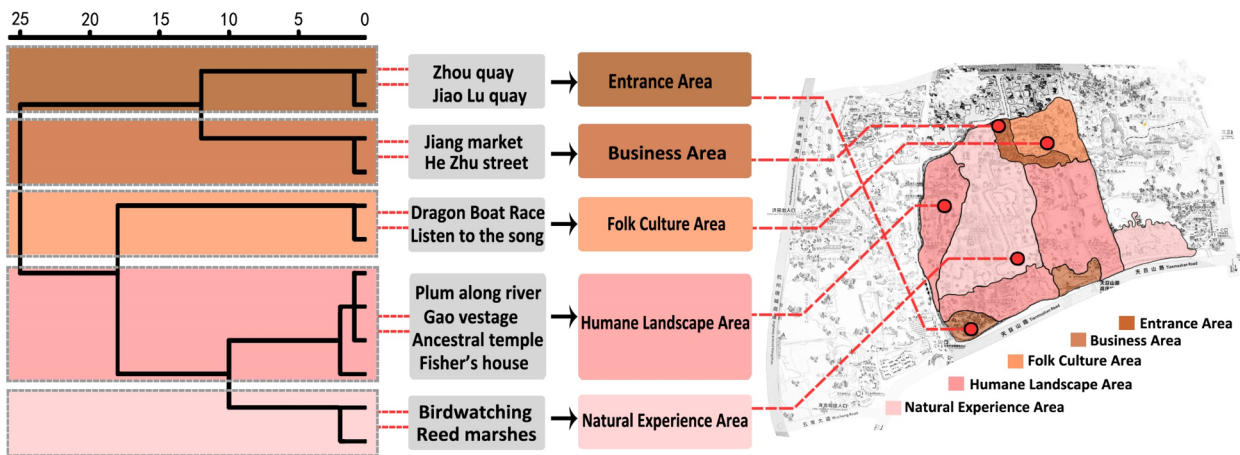
### 4.4 Subarea of soundscape

Cluster analysis is one of the commonly used numerical taxonomic methods. The principle is that some things are classified according to their similarity and make similar things as much as possible. The results of tourist perception evaluation of samples and indicators are processed preliminarily through Excel in study area and it can obtain the index score of sound elements (**Table 5**). Import the data from **Table 5** into SPSS. And according to the score of tourist perception evaluation, the Euclidean distance between each sample is calculated. According to the size of distance dividing affinity-disaffinity relationship, the soundscape in study region fall into several areas.



**Table 4** The score ranking of preference and integration.

| the score of preference |                                   |        | the score of integration |                                   |        |
|-------------------------|-----------------------------------|--------|--------------------------|-----------------------------------|--------|
| number                  | sound name                        | score  | number                   | sound name                        | score  |
| 1                       | chirm                             | 1.489  | 1                        | chirm                             | 1.311  |
| 2                       | voice of leaf                     | 1.400  | 2                        | voice of rain                     | 1.289  |
| 3                       | voice of rain                     | 1.322  | 3                        | voice of fog                      | 1.256  |
| 4                       | voice of aquatic bird             | 1.294  | 4                        | voice of aquatic bird             | 1.244  |
| 5                       | voice of stream                   | 1.209  | 5                        | voice of leaf                     | 1.233  |
| 6                       | voice of fog                      | 1.178  | 6                        | voice of stream                   | 1.228  |
| 7                       | voice of cicada                   | 1.022  | 7                        | voice of boats across the water   | 1.067  |
| 8                       | voice of boats across the water   | 0.944  | 8                        | voice of cicada                   | 0.922  |
| 9                       | voice of stage performance        | 0.867  | 9                        | voice of stage performance        | 0.889  |
| 10                      | voice of Dragon Boat Race         | 0.828  | 10                       | voice of Dragon Boat Race         | 0.839  |
| 11                      | background music of the park      | 0.833  | 11                       | background music of the park      | 0.778  |
| 12                      | voice of chime                    | 0.378  | 12                       | voice of chime                    | 0.467  |
| 13                      | voice of guide interpretation     | 0.355  | 13                       | voice of frolic                   | 0.244  |
| 14                      | voice of frolic                   | 0.011  | 14                       | voice of resident life            | 0.233  |
| 15                      | voice of steam-whistle            | -0.011 | 15                       | voice of guide interpretation     | 0.200  |
| 16                      | voice of resident life            | -0.022 | 16                       | voice of steam-whistle            | 0.011  |
| 17                      | whisper                           | -0.156 | 17                       | whisper                           | -0.044 |
| 18                      | yo-heave-ho (voice of selling)    | -0.161 | 18                       | voice of motor vehicle            | -0.144 |
| 19                      | noise of tourist                  | -0.183 | 19                       | noise of tourist                  | -0.178 |
| 20                      | voice of motor vehicle            | -0.311 | 20                       | yo-heave-ho (voice of selling)    | -0.300 |
| 21                      | voice of audio in business street | -0.361 | 21                       | voice of audio in business street | -0.622 |
| 22                      | voice of construction             | -1.539 | 22                       | traffic noise outside             | -1.561 |
| 23                      | traffic noise outside             | -1.639 | 23                       | voice of construction             | -1.672 |

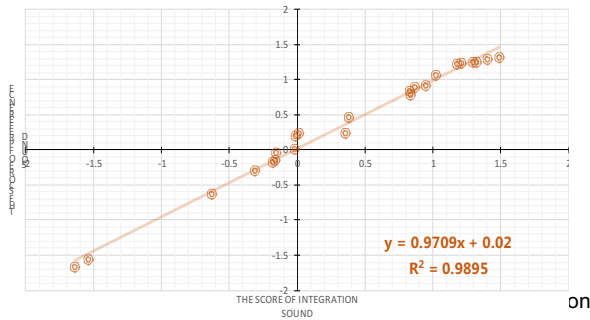


**Fig.11.** Cluster analysis of perception evaluation and zoning map of soundscape in study area

**Table 5.** The score of soundscape in scenic spot

| scenic spot        | liveliness | boisterousness | pleasure | feature | nature | irritability |
|--------------------|------------|----------------|----------|---------|--------|--------------|
| Bird watching      | 0.37       | -0.57          | 1.56     | 0.27    | 1.87   | 1.23         |
| reed marshes       | 0.11       | -0.01          | 1.70     | 0.72    | 1.55   | 1.33         |
| fisher's house     | 0.85       | 0.11           | 0.35     | 0.43    | 0.75   | 0.03         |
| plum along river   | 0.67       | 0.24           | 0.47     | 0.57    | 0.63   | 0.56         |
| Gao Village        | 0.22       | 0.37           | 0.53     | -0.27   | 0.80   | 0.53         |
| ancestral temple   | 0.15       | 0.12           | 0.62     | -0.10   | 0.35   | 0.23         |
| Dragon Boat Race   | 1.55       | 1.72           | 1.06     | 1.70    | -0.35  | 1.33         |
| listen to the song | 1.46       | 1.61           | 1.12     | 1.56    | -0.27  | 1.24         |
| Jiang market       | 1.21       | 1.29           | 0.25     | 1.23    | -1.23  | -1.32        |
| He Zhu street      | 1.13       | 1.20           | 0.46     | 1.47    | -1.45  | -1.25        |
| Zhou quay          | 0.02       | 1.43           | -0.78    | 0.01    | -0.05  | -1.73        |
| Jiao Lu quay       | 0.04       | 1.39           | -0.89    | 0.03    | -0.12  | -1.71        |





From **Fig 10**, the soundscape of study area consists of 5 regions: entrance area, business area, folk culture area, natural experience area and humane landscape area (**Fig.11**).

Entrance area which is characterized by featureless, noisy and artificial. The soundscape area mainly consists of two entrances in study area. The sound elements in this region are mainly comprised of voices of motor vehicle and voices of noisy chat, because of the area nearing the street, more open and sparse vegetation.

The characteristics of business area are lively, noisy and artificial. The soundscape area mainly consists of He Zhu District and Jiang Cun Market in study area, often hearing the noise of tourists, yo-heave-ho and voices of audio.

The features of folk culture area are boisterousness, lively, cheerful and characteristic. The soundscape area include stage performance area, dragon boat race area and business district. It is the most dynamic area in the park and the sound elements in this area are mainly comprised of voices of play, laughter, voices of stage performance, voices of Dragon Boat Race and voice of music.

It is characterized by natural, quiet and friendly in natural experience area. This area is mainly comprised of river ports, ponds, rivers, swamps, trees and other natural landscape. The sound elements in this region are mainly voices of stream, chirm, voices of leaves, etc. It can make tourists feel natural and relaxing.

The characteristics of humane landscape area is not prominent, but it is quiet, pleasant and natural. The main sound elements in this region are voices of introduce and whisper of tourists.

## 5. Summaries and conclusions

The soundscape of XIXI Wetland Park is in terms of perception evaluation and the results are analyzed in this paper. The following conclusions are drawn through the analysis.

The soundscape in study area is mainly comprised of geophonies, biophonies and anthrophonies. Among them,

geophonies and biophonies are more abundant. And anthrophonies takes the second place.

The relationship between preference and integration has correlativity, and the evaluation results show positive correlation. The higher evaluation of preference is, the more harmony with surrounding environment is. The results show that soundscape has a certain correlation with the surrounding environment. The following aspects will be considered in the improvement design of the soundscape of XIXI Wetland: preservation and cultivation of natural sound, prevention and control of noise, and creation of comfortable and satisfactory soundscape. Generally speaking, the smaller the space scale covers, the stronger the diversity of the soundscape is, and the stronger the architectural sound elements in the design are. On the contrary, the larger the space scale covers, the stronger the unity of the soundscape is, and the stronger the urban planning elements in the design are.

According to tourist perception evaluation, the study area consists of 5 areas: entrance area, business area, folk culture area, natural experience area and humane landscape area. The entrance area is relatively noisy. The business area is lively. The folk culture area is richer in feature. The natural experience area is more joyful and the humanities landscape area is bland in soundscape. Through the reasonable division of the area, visitors can get what they need. Tourists can not only relieve the pressure and mental exhaustion brought by urban life and work in a tranquil atmosphere, but also entertain themselves through various activities in a lively atmosphere, different demands of vitality can be understood.

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