Applying Soundscape to Creating an Interactive and Cultural Centered Experience

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Abstract. Soundscape, the composition of Sound and Landscape proposed by Schafer [2] in 1970s, refers to the environmental landscape composed of sound. Extended from acoustic studies, soundscape study stresses more on the bonding relationship between sound and social culture. This research aims to apply sound as the key element to design travel web and mobile applications could have travel offer cultural experience and emotional awareness and further construct a new design. Focusing on local sound, local soundscape is investigated in this study. Assisted with literature review, field research, and in-depth interview to analyze local characteristics and soundscape, the design elements are integrated in the travel web design, the soundscape with rich historical, geographic, ecological, and cultural information is confirmed, and the soundscape web design framework is proposed. The framework does not simply plan travel map and local travel web, but could provide designers with the abstract method for soundscape elements for being applied to digital media, mobile application design, and experience design. Finally, several suggestions and considerations are concluded.

Keywords: Soundscape · Travel web · Mobile travel application

1 Introduction

Making a comprehensive survey of current travel web and mobile applications, most of them focus on visual perception, but few apply five senses as the experience media. As a matter of fact, visual perception indeed presents 80 % of human senses that visual perception leads people's cultural experience and perception. However, it is wondered whether using sound for people experiencing culture could enhance the memory and understanding of culture. It becomes the investigation in this study whether applying sound as the key element to design travel web and mobile applications could have travel offer cultural experience and emotional awareness and further construct a new design.

2 Literature Review

2.1 Cultural Value of Soundscape

Soundscape, the composition of Sound and Landscape proposed by Schafer [2] in 1970s, refers to the environmental landscape composed of sound. Extended from

acoustic studies, soundscape study stresses more on the bonding relationship between sound and social culture. From various aspects, such as musicology, sound and image studies, ecology, and sociology, soundscape study presents distinct reference and applications. From the aspect of musicology, Schafer [2] proposed the idea of soundscape triangle by considering soundscape as The Music of the Environment and regarding soundmark, signal, and keynote as the analysis reference. Nevertheless, it could hardly prove the cultural value of soundscape simply from the aspect of musicology. Wang [6] therefore followed the idea of soundscape triangle proposed by Schafer [3], combined the ecological triangle structure developed by Tilly [5] from the aspect of sociology, and integrated soundmark, signal, and keynote into the social context of human, space, and activity to develop the city soundscape study structure. Furthermore, local soundscape value was classified according to historical sound, cultural sound, social sound, and natural sound with Soundmark so as to design urban soundscape with cultural value. Soundscape presents the cultural value for local marketing and local asset.

Schafer [2] indicated in Five Village Soundscape that, in addition to artificial sound and natural sound, soundscape further covered "historical memories". Soundscape is defined by Ministry of the Environment, Japan, as "sound environmental goods" and "sound cultural goods", which are a part of "cultural heritage". Apparently, the cultural value of soundscape is not simply the cultural heritage, but could rich the urban "sound expression" when regarding a city as an "organism", in which the "exchange circle" composed of soundscape contains the positive exchange among people, space, activities, and sound in the city [5].

2.2   Shuilin is Defined in this Study as the Area for Soundscape Collection

Shuilin is a plain located in the northwest of Chianan Plain, where more than a half of villagers are farmers and "Shuilin yam" is the representative produce. Such an agricultural structure allows Shuilin conserving the early agricultural society, culture, and landscape with thick friendliness. As one of the earliest developed cultivation areas, Shuilin conserves the religious and historical characteristics as well as western rural characteristics and presents cultural landscapes with settlement characteristics. Especially, regional kin temples still conserve the special ceremonies; various temples and ancient buildings become the primary cultural heritage in Shuilin.

2.3   Related Works

Sinha et al. [4] developed the application to monitor noise in a city. The soundscape application involves capturing of audio data using user's mobile phone, extracting the attributes and posting the same to the backend, running analytics on the same and then displaying it using a legend-based heat-map on a dashboard. Zhang and Huang [9] stateded that today's effervescent cities produce lots of new sounds while accelerating the terminating of traditional ones. They proposed to evoke the lost memories of neglected sounds by forming an interactive, emotional centered experience. They developed the application "More Than Sound", an on-line social soundscape with three

major components: a mobile application, a web and a public sound installation, outlining social scenes and life stories, it stimulates the visitors to form a deeper comprehending of their living environment through cities' splendid sound silhouette. Finney and Janer [1] apply unstructured databases for soundscape creation, and depict an autonomous soundscape system for virtual reality environments that use the Freesound database to augment scenes from Google Street View with sounds. Words that portray objects in the scene, referring to sound sources, are used to search the database for recordings, which are then operated into a total soundscape for that scene. Resulting soundscapes were found to illustrate the scene effectively for subjects when assessed.

3 Methods

Step 1: Taking Shuilin for the investigation, the soundscape structure proposed by Wang [7] is applied to the field research on human, space, and activity with observational method for soundscape collection.

Step 2: The soundscape characteristics are further picked out and supplemented through literature review and in-depth interview with local citizens. Besides, local soundscape value is classified into historical sound, cultural sound, social sound, and natural sound, based on phonetic indicators, for analyses.

Step 3: The idea of "time" is included to make the travel concept map of Shuilin sound scape, which is cross-organized from present sound, lost sound, and new sound with Step 2.

Step 4: The idea of "time" is included to make the travel web and application concept map of Shuilin soundscape, whose feasible direction is cross-organized from present sound, lost sound, and new sound with Step 2.

3.1 Analysis of Shuilin Soundscape

The general investigation areas are selected according to *164 Happy Trips* in Shuilin, published by Yunlin Country Government [8]. Observational method is utilized for the field work to collect the soundscape in the routes and further investigate what local citizens regard as characteristic local sound with in-depth interview. After observing the places and collecting the sound through observational method, in-depth interview with local citizens is proceeded for the complete and objective sound collection so as to supplement and filter the characteristic soundscape in Shuilin. Soundscape presents "historical memories" [3]. Current and past local cultural heritage could be understood from soundscape. By the lapse of time, soundscape would change, disappear, or emerge the new one. Promoting local tourism aims to have travelers deeply understand local culture and evolution.

Based on the characteristics of phonetic indicators in Shuilin, historical sound, cultural sound, social sound, and natural sound as the vertical axis and present sound, lost sound, and new sound as the horizontal axis (proposed in this study) are classified in the Table 1, expecting to highlight the time evolution and distribution characteristics of Shuilin soundscape.

From Table 1, Shuilin soundscape appears thick rural characteristics in Taiwan in terms of social sound and natural sound, including sound of people and distinct sound of vendors in markets, sound of agricultural machines, biological sound in natural farms, and sound of strong wind in the west. The dense life in early western rural societies in Taiwan is conserved, as it is precious in modern urban societies. The original natural ecology, such as golden bats, is restored the sound of bats with machines by A local cultural museum. It is considered as an alternative soundscape experience.

In regard to historical sound, Shuilin, as one of the earliest cultivation areas, presents distinct culture generated by cultivation. The major characteristic is the kin

Table 1. Analysis of Shuilin soundscape

Features of phonetic indicators	Present sound	Lost sound	New sound
Historical sound	• Sound of machine in He Hsing Rice Miller (it is still working nowadays) • Shun Tien Temple, • Siang Yu Temple, • Tung Tien Temple, • Chi Hsing Temple (religious carnival sound of firecrackers and sound of people in festivals)	• Chi Historical Place (sound of activity in space) • Ancient sugar railways (railways and sound of train whistle) • Chi Chiao Well in Chung Chuang (sound of water-drawing)	
Cultural sound	• Sound of making scaffold ing stage for glove puppetry • Sound of performance		• Sound of making musical instrument in the ukulele factory • Sound of playing
Social sound	• Sound of people and dis tinct sound of vendors in Shuilin markets • Chatting sound in Niao Song Restaurant • Sound of sugarcane scraping • Sound of selling in Liang Hsin Chinese herb tea • Sound of polishing in Tai Yuan bamboo art • Mechanical sound in Shuitien tiller • Cooking sound in the kitchen of Niao Song Restaurant		

Natural sound	• Quacks in duck factories • Singing of little egret • Croaking of frogs in paddy fields • Babble of Beikang River • Howl of western sea wind in the west • Sound of wind blowing rice plants • Sound of animals in Wan Hui Ranch • Bird singing at places		• Sound of deer in Chin Wang Deer Raising • Acoustic experience in Formosan Golden Bat's Home

temples in the cultivation areas. Such temples present special historical sound, especially the worship, which still conserves the historical custom characteristics. Nonetheless, the historical sound in some places is disappearing, among which sound of train whistle on sugar railways, sound of space in Chi Historical Place, and sound of water-drawing of Chi Hsing Well are lost. Sound of firecrackers and music in temples during festivals and sound of machines in He Hsing Rice Miller are conserved currently; Fanshu Matsu in Shun Tien Temple and He Hsing Miller are particularly apparent. The place is full of temple soundscape with cultivation history and the operation sound of miller for more than a century. Regarding cultural sound, cultural sound in Shuilin does not appear siginficant local characteristics. However, ukulele has become a new culture mark in Shuilin. With the integration and exchange between a local cultural museum (Kuan Chi Guitar Factory) and locals, the soundscape of ukulele is gradually combined with Shuilin and become a new representative of cultural sound.

3.2 Design Concept of Shuilin Soundscape Tourism

From above analyses, the soundscape elements are organized, in which several places are suitable for local tourism. The designed Shuilin soundscape travel web prototype presents international characteristics that it is designed bilingually, Chinese and English. First, Chinese and English could be selected in Introduction page to switch to the Home page of "Sonic Travelling in Shuilin", which is introduced on the left of Home page, while the Shuilin map is shown on the right. Scenic spots shown with different colors could be clicked in order to listen to the environmental sound and show the visual images of scenic spots. The design process concept framework is shown and analyzed as below (Fig. 1).

Route 1 offers historical learning, experience, and imagination. The historical sound of Shuilin is divided into the conserved sound and the lost sound. Most of the conserved sound are related to festival activities in temples, which are restricted the time and could not connect with the soundscape spots. For this reason, the sound of machines in He Hsing Miller, which is next to Shun Tien Temple, is suggested as the center of the route. It could be connected to temples with sound and lost historical
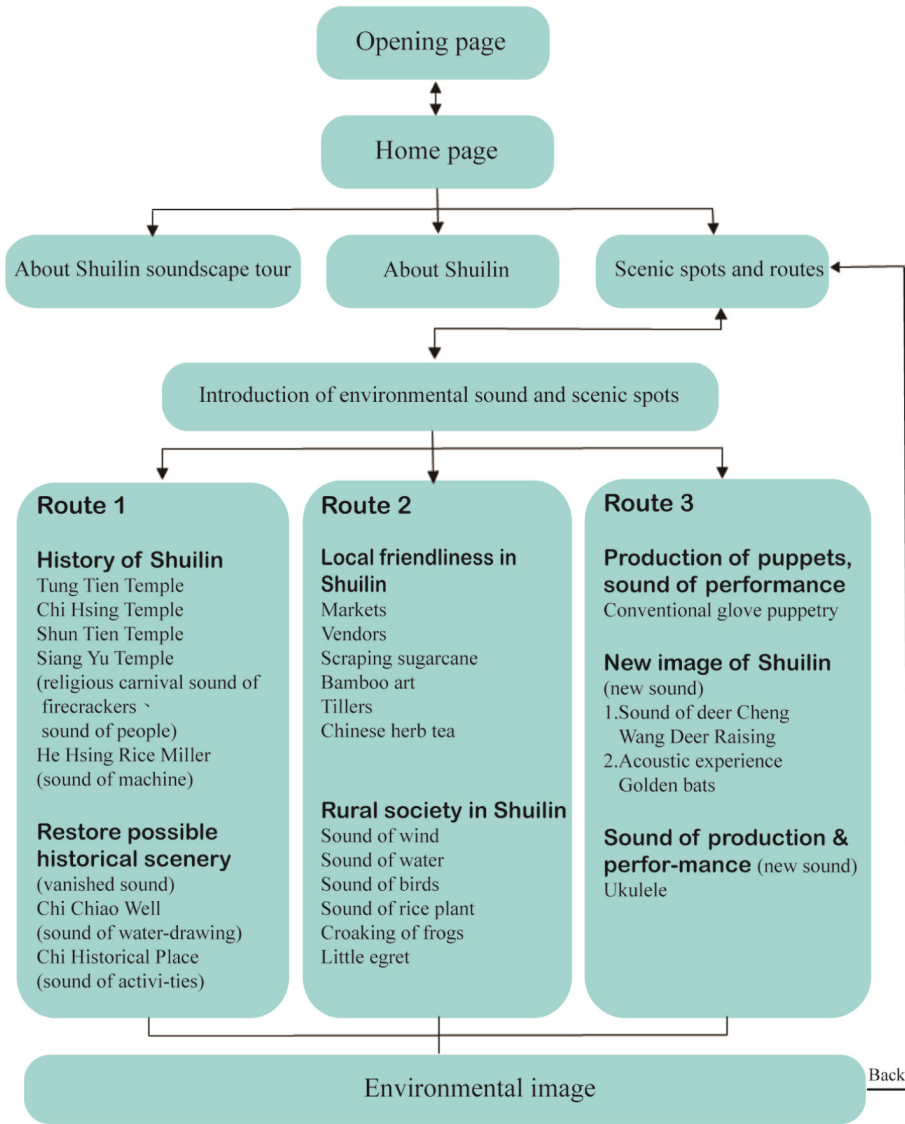
Fig. 1. Design process framework for Shuilin soundscape travel prototype

soundscape spots. With the title of "Passing through the century, the past imagination of Shuilin", the travelers could know the Shuilin history, listen to the existing historical soundscape, reconstruct the lost historical soundscape in Shuilin, such as ancient sugar trains, and enhance the in-depth experience of town travel by the introduction of cultivation, temple, and industrial history.

Route 2 offers the geography, social learning, and experience in western Taiwan. The social sound and natural sound of Shuilin reflect the rural social structure and the geographic characteristics in western Taiwan. Such soundscape therefore is integrated with local geography and social information to plan the learning and experience route for students. Not only could the geographic characteristics in western Taiwan be known, but the soundscape with friendliness and life in disappearing rural societies could be contacted.

Route 3 provides diverse developing sonic experience in Shuilin. Local characteristics are actively developed in Shuilin. The introduction and transformation of new and old industries have the soundscape appear more diversity. Combining such new characteristic soundscape with the history travel could correspond to the past and future of Shuilin and realize the ecological and social characteristics in Shuilin with the geographic society so as to present the active dimension of Shuilin.

4   Conclusion and Suggestion

Focusing on local sound, local soundscape is investigated in this study. Assisted with literature review, field research, and in-depth interview to analyze local characteristics and soundscape, the design elements are integrated in the travel web design, the soundscape with rich historical, geographic, ecological, and cultural information is confirmed, and the soundscape web design structure is proposed. The analysis framework is based on sociology to discuss the cultural value generated by including soundscape in the travel web design and development as well as allow the users knowing culture and acquiring pleasant emotion and use experiences. The framework does not simply plan travel map and local travel web, but could provide designers with the abstract method for soundscape elements for being applied to digital media, mobile application design, and experience design.

Finally, several suggestions and considerations are proposed for successive research.

1. Application of "Sonic Travelling in Shuilin" prototype. The prototype allows the successive research developing more diversely. For example, the design of multi-media interactive system could be placed in the exhibition for interacting with the participants; and, the design of websites would allow the users uploading new sound with the mobile travel application.
2. Verification of "Sonic Travelling in Shuilin" prototype. To ensure the success of the soundscape prototype, local elders and travelers could be continued in-depth interviews and usability test. With such verification, favorable improvement for the soundscape design prototype could be proposed.
3. "Lost historical sound" is an interesting idea. A new in-depth human-machine interactive travel model could be developed by combining visual perception or text data with travel for deeper imagination.
4. The classification and application of soundscape in this study could be the reference of relevant interactive design in the future.

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