

Soundscape approach in urban renewal: parks and areas of acoustic quality

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Introduction

Noise pollution is still perceived by urban population as of major concern in their day life, in many cases second in terms of importance only to air quality. Although this consideration and the considerable efforts in the application of noise control policies (noise mapping, action plans, transport noise regulation) made by noise control engineering community and by politicians, the general feeling is that urban environments is under a inevitable process of „sound globalization“. Urban spaces are losing specific sound-marks [1], less areas fulfill the sound expectation of the population, noise level are not decreasing as expected. This is more evident in densely built areas and historical cities where the primary sound source is not only transport (cars, motorcycles) but a complex of human activities with their rhythms. In these habits a resignation feeling is growing among stakeholders. This is confirmed by low reactions of the population (petitions, strikes), less interest of the media in underlining the problem and of the city management in facing the problem. The reason of this apparent failure is probably the way in which the problem has been tackled: a top-bottom approach in which “controlling noise“ is the only keyword but no alliances have been really made.

The Soundscape approach can be the new frontier. Despite the many definitions proposed, the many methodologies (qualitative and quantitative) elaborated, and the tentative of standardization [2], all experts agree that the Soundscape approach integrates interdisciplinary work with more competences (acoustics, art, sound quality, psychoacoustics, physiology, neuroscience and social science) [3] and that the role (behaviors, expectations) of the population is more emphasized. There are then more possibilities to tackle any problem according with a bottom-up approach in which population is actor (new experts [4]) and not only observer.

Positive signals arrive also from architects and urban planners. It is growing among them the idea of a new urbanism based on the “sense of city” and on its created and perceived *atmosphere*. It is proposed a broader view of the urban spaces that takes into consideration the full spectrum of perceptual phenomena (sound, smell, touch, ...) beyond the regime of the visual which has in the past dominated [5]. These concepts open possibilities to larger applications such as urban renewals. The soundscape approach can be protagonist integrating itself with other urban disciplines in the common aim to build up accepted and *well-being* urban spaces.

In this paper is presented a interdisciplinary methodology applied to the historic centre of the city of Naples (Italy) which, as Unesco Patrimony, will be during the next years

under a complex urban renewal project. The methodology connects cultural heritage disciplines, visual and audio perceptions of urban spaces, but also mobility studies on pedestrians and population's attitude and expectations. The aim is to identify, inside the vast historic centre, areas which already have the potentiality of “restoration parks and areas of acoustic quality” or that can achieve easily this classification with urban renewals. Immersive audio-visual virtual reality tools will be used to validate the methodology and the projects of urban design in these areas.

Description of the location

The historic centre of Naples is one of the 51 historic centers included by Unesco in a World Heritage list. Motivation are “... the site is outstanding universal value being one of the most ancient cities in Europe.... Its street pattern, its wealth of historic buildings from many periods...”. To keep the WH status, material and immaterial conservation management action must be programmed and in this direction the City Council has started up a program whose aim is to achieve development and to increase the environmental conditions and the quality of life of the residents. Not only restoration of buildings but an articulated series of integrated material interventions such urban renewals on streets and square and immaterial interventions on security and perceived environmental conditions.

The historic centre of Naples is very large and includes a regular mesh of narrow streets around three main parallel ancient roads (*decumani*). Along the streets and the *decumani* the visitor can find large squares, very small widening and an impressive number of closed cloisters with gardens which are part of the surroundings. The site is occupied by residents, shopkeepers and handicrafts, but it is mainly crossed day and night by many visitors (local residents, residents from other parts of the city, tourists). Some information on the complex soundscape of the area are reported in a previous study [6]. The general sensation is that live together noisy and quiet areas but consciously there is not always certain information about it. Emblematic is the example of the S.Chiera convent cloister (Fig.1). It is a regular square space, enclosed in a built insula, in the same time inside and outside the context. For the local population this site is the quintessential of a urban oasis and it is used, in spite of its architectural and historic features, as a contemplative park.

Multi sensorial approach

The proposed methodology is mainly based on recent research results which seem to be appropriate. In a recent study [7], it has been proposed to describe the urban

soundscape in terms of two independent emotional dimensions (*Calmness and Vibrancy*). Also *expectation* is an important factor in the perception of soundscape [8]. Other studies have underlined the human auditory memory of environmental sounds [9], the capacity to associate places to sound [10] and the role of audio-visual interaction on the perception of tranquility [11]. In this last study a tranquility rate TR has been correlated to the equivalent constant A-weighted level L_{Aeq} and to the percentage of natural features present in the area.



Figure 1: S.Chiera convent Cloister

Nevertheless, besides sound, other environmental features can influence the emotional reaction in historic district : visual contamination, spatial perception, light (natural and artificial), microclimate, odors, architectural degradation. Each of these features can be quantified with a numerical parameter.

In other research fields it has been stressed that pedestrian movement in urban sites can be described with models in which agents (pedestrian) have the ability to perceive, learn from their environment and consequently make decisions and act (move accordingly) [12].

All above, the assumption considered in the method is that a visitor walking in the historic district (in a dynamic sequence) experience several variation of the environmental parameters and these variation influence its emotional reaction and also its decisions (move faster, stop to enjoy,...). A potential “area of acoustic quality” appears when the variation of the acoustic parameters are all positive and congruent with the expectation, but a potential “calmness area or urban park” appears to the visitor only when all variation are environmentally positive, and this must happen from all arriving directions (Fig.2).

In the early-stage application, “walks” along all streets of the historic city have permitted to register all variation of the environmental parameters at the speed of a normal pedestrian. Comparing this data with a reference point (S.Chiera Cloister) and matching information with the citymap, it was possible to establish several sites which potentially already restore calmness like the reference point. In other sites the architects of urban renewal are using the information to adapt their projects and the validity of the projects is done with the help of Immersive Virtual Reality techniques.

So far the method has the limit to consider separately each sensory channels. Further development of the method will

consist in finding cross-sensory relations during the variation and will imply Immersive Virtual Reality laboratory tests.

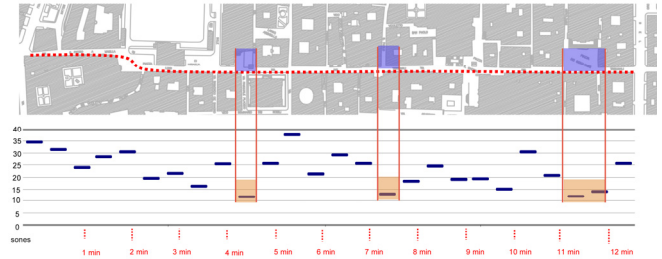


Figure 2: example of correspondence between low loudness and sites during a walk

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