

AUDIO CARTOGRAPHY: VISUAL ENCODING OF ACOUSTIC PARAMETERS

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Human, cultural, and environmental disciplines investigate severe medical and social effects, such as cardiovascular damages and problems of urban segregation which are directly related to an increasing noise pollution nowadays. Albeit highly heterogeneous, the domains often share a spatial point of view in describing environmental sounds and reveal interesting geographic connotations. Unfortunately, interdisciplinary exchange of perspectives and ideas is rare due to a shortage of appropriate tools to document the complexity of the sonic environment.

We introduce audio cartography as a communication framework for the systematic and coherent description of environmental sounds. Audio cartography serves as a visual language to involve all stakeholders concerned with the sonic environment on large scales. It is composed of fundamental building blocks for communication, documentation, and presentation that can be flexibly arranged according to specific use case scenarios or target groups.

Audio cartography meets two essential design challenges as to envision and map sound in large-scales environments. With regard to the visualization process, sound is an audible but invisible entity, and human perception is unfamiliar with the visual interpretation of acoustic information. Furthermore, the cartographic presentation of sound requires an integrative map design which allows for graphical intersections with other topographical objects to provide orientation in the setting and discover spatial patterns.

The implementation of audio cartography includes abstractions of acoustic data and information utilized by potential users. Each parameter describes a particular aspect of an acoustic situation, and although they rely on a specific background, the compilation and combination of the parameters prepare for an integrated view on the sonic environment. Subsequently, we visually encode these parameters into unique and distinct graphic variables which is achieved by employing codifications according to established practice based on perceptual and cognitive principles. The objective of the encoding is to provide a unique and discernible graphic counterpart for each acoustic parameter which matches its physical characteristic and variability. With a general and consistent visual encoding, we come up with candidate encodings that present plausible solutions for the visualization of sound.

Our codifications lead to the compilation of guidelines assembled into an extensible and modular design library that can be consulted according to specific tasks. We apply our encodings in practice and generate mapping examples. These maps highlight audio cartography as a beneficial visual communication framework through which knowledge can be connected and insight shared about the sonic environment.