Chapter 9

Innovative Sound Design of Car Alarms: A Case Study on Information Needs and Musical Creativity

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ABSTRACT

The present chapter examines the interaction between information needs and musical creativity in light of a case study concerning auditory warnings. As the object of study (auditory warnings or more specifically, audible alarms) is outside the scope of a sensu stricto musical field, the chapter offers a broader discussion of the role of information within the sound creation practice or sound design with the aim to explore the development of new car alarm sonic vocabularies and interactive systems, extending the conventional and rather limited current research domain of audible alarms. The chapter also presents the underlying collaborative model of a scientist and an artist who worked together to exchange know-how and knowledge in the context of an innovative project with research, artistic, and industrial implications.

INTRODUCTION

alarm/will/sound is a tripartite collaboration between a composer, a research fellow in the field of sound perception and design, and a product designer/visual artist. This project began in January 2013 under the auspices of the Ircam-IRC (Interface Recherche/Création') Artistic Research Residency program, and is still in progress at the time of writing (September 2015).

While the design of most sound-emitting components of the automobile (e.g. the audio system, engine, horn, turn signal, and door) have continuously undergone improvements and refinements in recent
decades, the car alarm has changed very little. Unlike other domestic and industrial security systems, audible auto alarms have proven to be ineffective as deterrents and are often considered more as an anti-social nuisance than as a benefit to the public.²

Taking as a point of departure the proven ineffectiveness of current audible car alarm systems as deterrents and the relative lack of research into and development of audible car alarm design, we have sought to produce innovative modified car alarm prototypes. The design of these prototypes has been informed by musical, artistic, scientific, and industry expertise, as well as sound perception research and acoustic modeling. In the larger scope—and to some degree—with reference to the work of Patterson and Datta (Patterson & Datta, 1999)—alarm/will/sound can be seen as an attempt to extend the domain of auditory alarms, as it aims at developing an original framework and exploring new paradigms for proposing innovative morphologies and textures for warning signals.

This project has been the product of a convergence of interests in and experience with industrial sound perception and design, domestic security systems and the societal norms that they reflect, and the impact of sonic phenomena in physical environments on the aesthetics of composers and sound artists, as well as the extent to which composers and sound artists may shape sonic experiences of and in public spaces. The IRCAM Sound Perception and Design research team’s involvement with the automobile industry has assumed the form of a partnership with Renault on sound design for electric vehicles (in collaboration with composer Andrea Cera), a follow-up study on electric vehicle detectability in urban environments (Misdariis, Gruson, & Susini, 2013), and an earlier study on car horn sound quality (Lemaitre, Susini, Winsberg, Letinturier, & McAdams, 2009). Research topics in the domain of human-machine interaction have included the influence of audio features on perceived urgency and its application to car interior Human-Machine Interfaces (HMIs) (Suied, Susini, & McAdams, 2008) and the influence of naturalness of auditory feedback of an interface on perceived usability and pleasantness (Susini, Misdariis, Lemaitre, & Houix, 2012). In addition, Alexander Sigman’s background in Cognitive Science and timbre perception has been highly relevant to the project’s collaborative model. It is hoped that the research and artistic outcomes of alarm/will/sound will contribute not only to the understanding and development of vehicle alarm systems specifically, but also to the design and classification of auditory warnings in general.

In the interest of developing the latter dimension of the project, the MIR (Music Information Retrieval) theoretical approach and its operational implementation have been of a certain help to achieve the project’s objectives, especially concerning the relationships between information seeking and creativity. For example, in Lavranos, Kostagiolas, Korfiatis, & Papadatos (2015), the representation of a “generalized framework relating information-seeking needs and sources employed for musical creative activities” is divided into four categories: (a) music information needs; (b) music information sources; (c) musical creative activities; and (d) musical creative products (p.10). This taxonomy may be readily adapted to the alarm/will/sound project components, especially in light of the sub-categories that Lavranos et al. define: (a) knowledge-related needs (the relative positions of synthetic auditory warnings within an acoustic descriptor space and other experimental findings, as well as the application of these findings to music composition projects); (b) conventional and interpersonal resources (sound databases and signal processing algorithms); (c) composition, performance, and improvisation-related activities (the creative process of designing new auditory warning signals, including improvised and interdisciplinary works produced based upon these auditory warnings); and (d) activities related to composed music scores and recordings (the production, experimental testing, and documentation of human experience with new alarm systems, as well as the notation and recording of creative works stemming from the experimental
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