SONIFICATION MAPPINGS DATABASE ON THE WEB

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INTRODUCTION

It is not always clear to a display designer how to use sound most effectively to represent data values. This is where the cumulated experiences of the auditory display community could greatly assist in the creation of more effective and more useable sonifications and auditory displays. However, there is no one central place to find recommendations about which sounds are best for a given data type. Past results in this field have been presented in a broad range of journals, publications, and conference proceedings, making it difficult to search for design guidance. In the absence of such guidance, a designer might wish to try out several competing approaches to determine the best performer. Unfortunately, schedule and budgetary constraints often make this impractical, if not impossible. Thus, there is a clear need for a central repository where researchers can contribute their experience and wisdom about data sonification and auditory display design.

Walker [1][2] has pointed out that in order to begin creating a successful sonification it is critical for a designer to know at least three things about the data-to-sound mapping:

1. **The nature of the mapping**. Which data dimension (e.g., temperature, pressure, velocity) is mapped onto, or represented by, each acoustic parameter (e.g., frequency, loudness, tempo)? For example, temperature may be represented by the frequency of the sound, so that as temperature changes, the frequency of the sound changes.
2. **The polarity of the mapping**. When the temperature increases, does the frequency of the sound increase or decrease? In the case of temperature-to-frequency mapping, it is likely best to use an increasing-to-increasing (or up-up) polarity. However, in the case of size and frequency, it is likely best to use an increasing-to-decreasing (up-down) polarity.
3. **The scaling of the mapping**. If the temperature increases by 30 degrees, how much change must you make in the frequency to convey that temperature change to the listener?

ONLINE SONIFICATION DATABASE

To help sonification designers make decisions about mappings, polarities, and scalings, we have established an online, freely accessible database of sonification mappings. The database also includes any other type of information that researchers feel may be useful to a designer. This shared, community-built resource will allow researchers and designers to find out what sound parameters have been used by others to represent specific data dimensions, and what has worked (or not worked).

The primary focus of this database is on sonification projects in which scientific data are represented by varying the value of sound parameters. However, a range of other auditory display projects are also included. The exact studies included will depend on the needs and contributions of users. Examining the efforts and results of all kinds of past auditory display projects will help designers make better decisions regarding new auditory displays.

Database Features

The database contains the full citation and reference to the work, a URL if available, the scientific domain the sonification was used in, the specific data and display dimensions employed, the mapping polarities, and detailed annotations about the findings of any experimental evaluation of the mappings.

There is a sophisticated search form, allowing users to search for studies by all fields, such as author, title, year, scientific domain, data dimensions, and sound attributes.

A key feature of the database is that it encourages researchers to contribute studies to the database. Studies can be added via a simple Web-based form, which has detailed online help to assist the user.

The database is accessible on the Internet using any browser at: http://psych.rice.edu/sonify/dbhome.html.

ICAD DEMO

At ICAD we will provide users with the opportunity to interact with the system, as we demonstrate the features and benefits of the database. The system is already in a stable, production quality state, with records being added all the time, however ICAD will provide a perfect opportunity for feedback regarding additions or improvements.

REFERENCES

[1] Walker, B. N.. *Magnitude estimation of conceptual data dimensions for use in sonification*. Unpublished doctoral dissertation, Rice University, Houston, TX, USA, 2000.

[2] Walker, B. N., Kramer, G., & Lane, D. M. "Psychophysical scaling of sonification mappings." *Proceedings of the Sixth International Conference on Auditory Display, ICAD 2000*. Atlanta, GA, USA, 2000.

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