

Summary

This diploma thesis presents the implementation of a Java application called xSonify to map scientific data to acoustic sequences. Listen to data is another computer-human interface and should be helpful to discover patterns in huge amounts of data and also be a help for visual impaired people to display data as a kind of substitute for a visual way to display numerical data.

The data can be imported from local files or from remoted databases via the Internet. Single results of measurements from spacecraft instruments can be selected by their corresponding variables in a specific time frame. The result will be transformed into MIDI sequences and can be played with a selection of different instruments from a soundbank.

Another software module enables xSonify to convert the sonified data into other sound formats to make it easier to archive and exchange the Sonification results with other scientists.

The usage of this software will be mainly in the areas of space science for scientists at NASA and other faculties who are working with numerical space science data. It is designed to serve as a standalone product with own data import functionality and can also be afterwards integrated into NASA's existing space science application like TIPSOD, ViSBARD, CDAWeb, etc. after the adaption of the data import module.

The chosen categories of Sonification are based on Stephen Barrass' Sonification design pattern: "PerceivingPatternInData"[1] and the results of the collaboration with Wanda Diaz, a blind astrophysicist student from the University of Puerto Rico. She was also very supportive for the Sonification tests and in the user interface design for visual impaired people.

The thesis consists of three general parts:

- The introduction which includes Chapter 1 until Chapter 2 should give the reader a more detailed idea of the abstract expression Sonification. It introduces also NASA's already existing space science applications including a short ex curse to the research field of the "Magnetosphere".
- The second part will be more technically and describes in Chapter 3 and Chapter 4 the used technologies and the software engineering process of xSonify.
- The third part will focus in Chapter 5 on the three different Sonification modes.

The reasons for the choice of Java as programming language was that xSonify is now platform independent and the already existing application where xSonify might be added as an additional module are also realized in Java.