Ableson: Towards Cheap and Cheerful Sonification of Time Series Data

Cárthach Ó Nuanáin (MTU Cork School of Music) Alan Giltinan (Blackrock Castle Observatory) {firstname.lastname}@mtu.ie



Context:	
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- Sonification, as defined by Kramer (2000) is "[to represent] data with non-speech sound'.
 - Sound can unearth patterns or insights to complex data that are not immediately inherent in other modes (e.g. visualisation) and enables visually impaired to understand and study scientific data.

Problem:

 As we have demonstrated in previous work exploring the sonification of protein structures (Ronan et. al. 2024), it can be technical and time-consuming, often involving several domain experts.

Solution:

- Ableson is an open-source, easy-to-use set of tools that integrates easily into a commercial Digital Audio Workstation (DAW) for rapid prototyping and sound generation.
 - We demonstrate its efficacy in a case study using galactic telescope data collected by MTU Blackrock Castle Observatory.



Inputs:

Any time series data like stock prices, weather forecasts, GDP, digital signals etc.

Here we use hydrogen levels in the milky way, measured during December 2022 by telescopes at BCO



Scaling:

Input values are scaled to the desired output range

Values in the new output range are indexed and sent to the mapping section



Communication:

Input, output data and their ranges can also be communicated over the network via the OSC protocol, to interact with other audiovisual tools, embedded systems and the Internet of Things (IoT).

Outputs:



Scaled output values can be mapped easily to synths, samplers and other sound generation tools in the Digital Audio Workstation environment.

Output values are indexed and triggered automatically according to the session tempo source.



Kramer, G. (2000). Auditory display: sonification, audification and auditory interfaces. Addison-Wesley Longman Publishing Co., Inc.. Ronan, I., Yanlin M., Venkata V., Ó Nuanáin, C., Tabirca, S. (2024). Sonification of 3D Protein Structures Using Supervised Machine Learning. *International Conference on New Music Concepts.*

https://github.com/carthach/ableson

