SUBJECTIVE COMPARISON OF MUSIC PRODUCTION PRACTICES USING THE WEB AUDIO EVALUATION TOOL

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ABSTRACT

The Web Audio Evaluation Tool is an open-source, browser-based framework for creating and conducting listening tests. It allows remote deployment, GUI-guided setup, and analysis in the browser. While currently being used for listening tests in various fields, it was initially developed specifically for the study of music production practices. In this work, we highlight some of the features that facilitate evaluation of such content.

1. INTRODUCTION

Perceptual evaluation of audio is an important part of research in virtually every audio-related field, and music production research is no exception. To facilitate listening test design without time-intensive development, compatibility issues, and limited interface options, the Web Audio Evaluation Tool was developed [1]. Initially developed with the evaluation of mixes in mind [2], the tool has since evolved to an all-round listening test platform, used and shaped by researchers from a wide range of audio research topics. Some prominent characteristics relevant to intelligent music production are discussed here.

2. FEATURES

In many cases, tests are run on one or more dedicated computers in listening rooms, sometimes in different countries. As these computers may have different operating systems or supporting software, developing an interface that works on all machines can be a challenge. This led to the choice for a browser-based tool, which only needs a browser that supports the Web Audio API and is therefore platform-independent. Equally important is the opportunity for 'remote' tests this offers, meaning no installation or setup of the tool is required, but participants can simply go to a website.

The comparison of differently processed musical signals is further made possible by instantaneous switching between stimuli, and synchronised playback of time-aligned audio fragments. This leads to seamless transitions where the relevant sonic characteristics change immediately while the source signal seemingly continues to play, and avoids excessive focus on the first few seconds of long fragments.

This is especially useful for the comparison of different signal processing algorithms or parameters. Optional cross-fading or inter-fragment silence accommodates other types of tests.

Whereas most available software still requires a substantial amount of programming or tedious configuration on behalf of the user, the Web Audio Evaluation Tool allows anything from test setup to visualisation of results to happen entirely in the browser, making it attractive to researchers with less technical backgrounds as well. The code or test configuration files only need to be altered when advanced modifications need to be made. Even for users proficient in web design, the GUI allows very quick setup and an immediate overview of test results, see Figure 1.
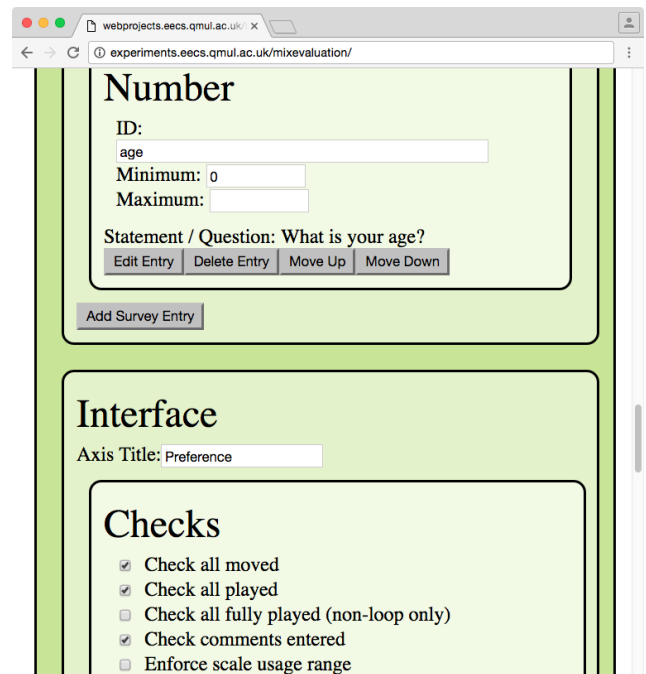

Figure 1: The test creation GUI allows quick and easy set up of any but the most advanced and customised interfaces

Based on experience from several researchers working on different topics, various other features have been added to address common difficulties and issues when designing,

conducting and analysing tests. Surveys are integrated in the interfaces so that answers are collected immediately before or after the test, or even before or after specific pages in the test. These include validation of responses and various question formats such as checkboxes, radio buttons, and embedded videos.

The test timeline and ratings can be visualised immediately upon finishing the test, to spot errors or misunderstandings quickly, or even do basic analysis of the results thus far in the browser, see Figures 2 and 3.
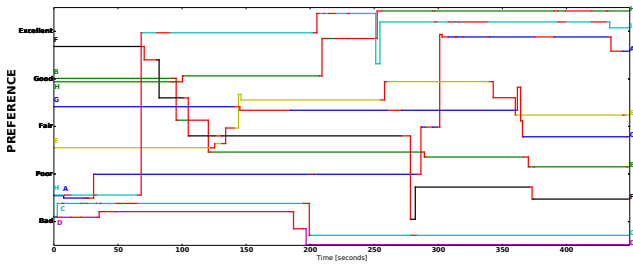

Figure 2: Timeline for a specific subject and test page, showing playback of the stimuli (red) and movement of the associated sliders as a function of time
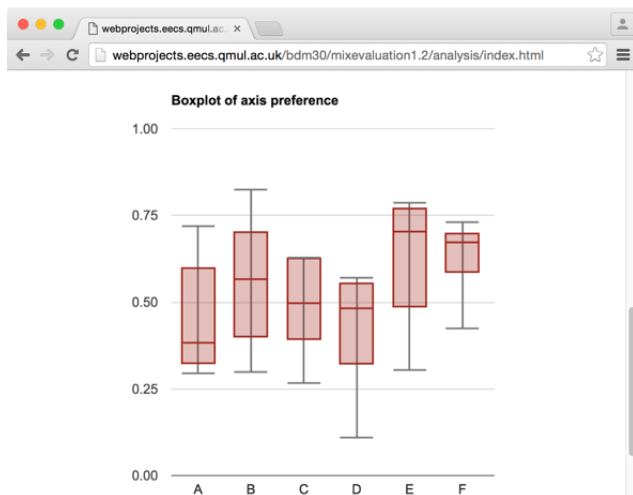

Figure 3: Box plot visualisation of results from several subjects

3. INTERFACES

Every common interface type for perceptual evaluation is supported by the Web Audio Evaluation Tool, and each can be customised to a large extent. For a modest number of stimuli, a multiple stimulus interface is preferred over single stimulus or pairwise comparison [3, 4]. As there is usually no reference when comparing differently processed versions of a musical signal, the popular MUSHRA interface [5] may not be appropriate. Furthermore, modified versions of MUSHRA featuring a single rating axis with multiple markers have been shown to be more accessible [6], akin to the APE-style interface [7] which typically includes comment boxes as well - see Figure 4.
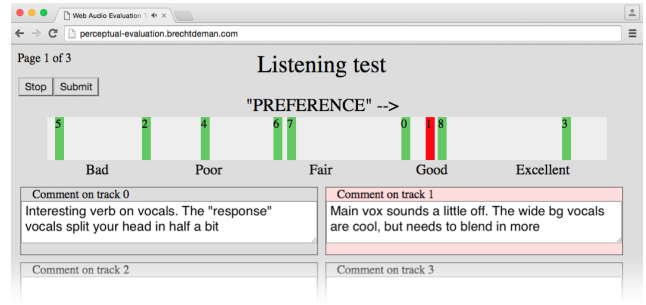

Figure 4: Example multi-stimulus test interface

4. CONCLUDING REMARKS

The Web Audio Evaluation Tool is a versatile, browser-based listening test platform, currently used for various applications including the evaluation of music production practices and audio processing algorithms. Apart from the time saved by using an off-the-shelf, feature-rich tool, research also benefits from an experimental apparatus that is well-documented and widely used.

The authors highly welcome any feedback and contributions on the GitHub page[1]. Source code is available as a ZIP or through git[1] or Mercurial[2].

5. REFERENCES

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