Introduction to Music Information Retrieval using Essentia.js

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ABSTRACT

Web Audio is an intrinsic part of the next generation of applications for multimedia content creators, designers, researchers, music tutors, artists, and consumers. New advances in web audio and software for audio analysis, music information retrieval (MIR), and machine learning open up exciting possibilities. We have recently released Essentia.js, based on one of the most popular MIR libraries on the native platform. We have also created various pre-trained deep learning models for inference with TensorFlow.js. In this tutorial, we introduce the key concepts in MIR and cover the basics of using the library for music and audio analysis. We will show example use-cases and assist the participants in building their MIR Web applications.

1. INTRODUCTION

With the adoption of HTML5, the latest W3C Web Audio API specifications and the development of WebAssembly (WASM), modern web browsers became capable of more advanced audio processing, synthesis, and analysis. This has paved way for the development of new extensive JS software libraries for audio analysis and music information retrieval (MIR). Lately, *Essentia.js* has been released by porting and extending one of the most common MIR libraries used in native applications to the web [2] It has been further expanded with machine learning inference functionalities, which we are presenting at WAC 2021, relying on TensorFlow.js [1].

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2. TUTORIAL STRUCTURE

The tutorial includes:

- Introduction to MIR and audio analysis. MIR applications and a typical analysis pipeline.
- Using Essentia.js for music and audio analysis. Overview of available music audio features and application use-cases.
- Getting started with Essentia.js. Writing your first "Hello world" application. Using Essenta.js for deferred-time vs. real-time analysis.
- Available demos and template projects in a JavaScript playground.
- Deep learning inference with Essentia.js using pre-trained machine learning models. Interface with TensorFlow.js.
- Demos and examples of using Essentia.js for machine learning inference.
- An industrial use-case example: audio problem detection for music distribution with Essentia.js.
- QA and a playground session.

3. REFERENCES

[1] A. Correya, P. Alonso-Jiménez, J. Marcos-Fernández, X. Serra, and D. Bogdanov. Essentia TensorFlow models for audio and music processing on the web. In *Web Audio Conference (WAC 2021)*, 2021.

[2] A. Correya, D. Bogdanov, L. Joglar-Ongay, and X. Serra. Essentia.js: a JavaScript library for music and audio analysis on the web. In *International Society for Music Information Retrieval Conference (ISMIR 2020)*, 2020.