

Client-Side Audio Declipping

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ABSTRACT

Clipping is an unpleasant recording artifact that occurs when an audio signal's level rises above a microphone's or AD converter's maximum input level. As more audio and video recordings are being taken on mobile devices (sometimes in high sound level conditions such as live concerts), clipping has become an issue that users encounter frequently. We present ClipAway: a web application that analyzes an audio file and automatically removes clipping from the audio file.

The following scenario illustrates the service we supply: 1) A user attends a live concert and creates an audio recording of the concert. 2) The user listens to the recording at home and notices clipping, which causes the listening experience to be unsatisfactory. 3) The user uploads the audio recording to the ClipAway website. 4) Audio processing occurs in the browser, and the user then exports a quality-enhanced version of the recording. 5) The listening experience with the resulting audio file has significantly improved.

The advantage of browser-based processing is that it is more familiar and accessible to most users than a native solution, which would likely require the user to install a standalone software or a digital audio workstation hosting a plugin for quality enhancement.

The declipping algorithm is split into two sections: clipping detection and clipping correction. Clipping detection involves the automatic estimation of the clipping level and the subsequent localization of clipped regions. The clipping level is determined by identifying anomalies in the signal's amplitude histogram near the positive and negative endpoints. The locations of clipping are determined by identifying samples with amplitudes close to the clipping level where the signal has a near-horizontal slope. Clipping correction involves replacing short clipped regions using spline interpolation and replacing long clipped regions through linear interpolation of time-frequency bin magnitudes.

WEB LINKS

Link to application: <https://cplaguna-audio.github.io/ClipAway/>

Source code: <https://github.com/cplaguna-audio/ClipAway>



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