

Implementation of Harmonic-Percussive Sound Separation for Audacity

Viktor Tamás Erdélyi

National Institute of Informatics

Saarland University*

Tokyo, Japan and Saarbrücken, Germany

Nobutaka Ono

National Institute of Informatics

Tokyo, Japan

Shigeki Sagayama

Meiji University

Tokyo, Japan

Project overview

Goal

Enable more people to use the Harmonic/Percussive Signal Separation (HPSS) sound effect

Possible applications

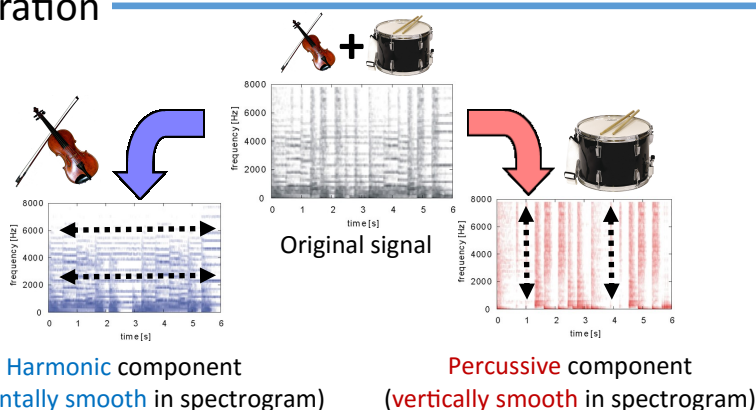
- Preprocessing for MIR-related tasks
- New type of music equalization

Our approach

Implement HPSS as a new effect for Audacity (a popular open source sound editor application)

Harmonic-percussive sound separation

- Separating the original power spectrogram into harmonic and percussive spectrograms by exploiting their anisotropies (**horizontal = harmonic**, **vertical = percussive**)
- Implementation based on sliding updates



Implementation in Audacity

Harmonic-Percussive Sound Separation

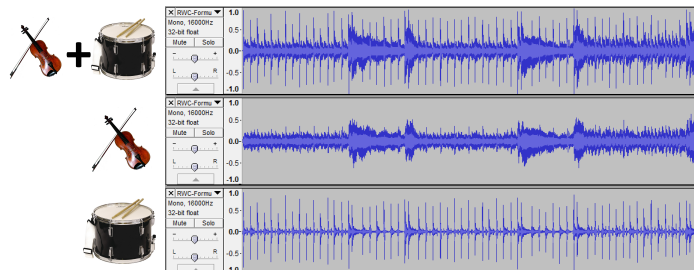
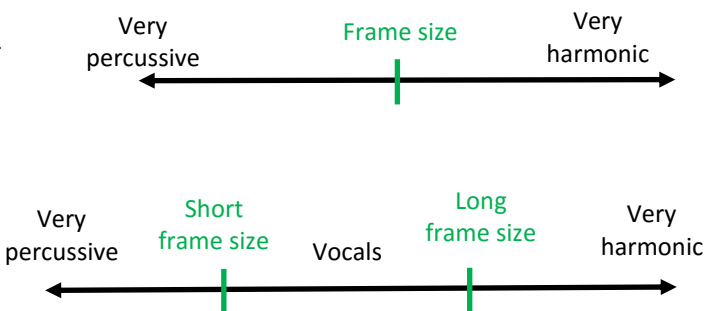
Separates a waveform into harmonic and percussive components

HPSS-based vocal separation

Applies HPSS twice with different frame sizes in the short-time Fourier transform (STFT) in order to obtain another decomposition for voice and other components

Effect parameters

- **Frame size** (acts as a “separation threshold”)
- **Mask type** (binary or Wiener; for time-frequency masking in STFT domain)
- **Output mode** (keep harmonic only, keep percussive only, or keep both)
- **Final amplification factor** (to avoid clipping)



Current status and references

We implemented the effects as a patch for Audacity and sent it to the developers.

[1] N. Ono, K. Miyamoto, H. Kameoka and S. Sagayama, "A real-time equalizer of harmonic and percussive components in music signals," Proc. the International Symposium on Music Information Retrieval (ISMIR), pages 139-144, 2008.

[2] V. Erdélyi, "HPSS source code as published on GitHub." <https://github.com/verdeliyi/audacity>.

* work done while at the National Institute of Informatics