Sony x AI

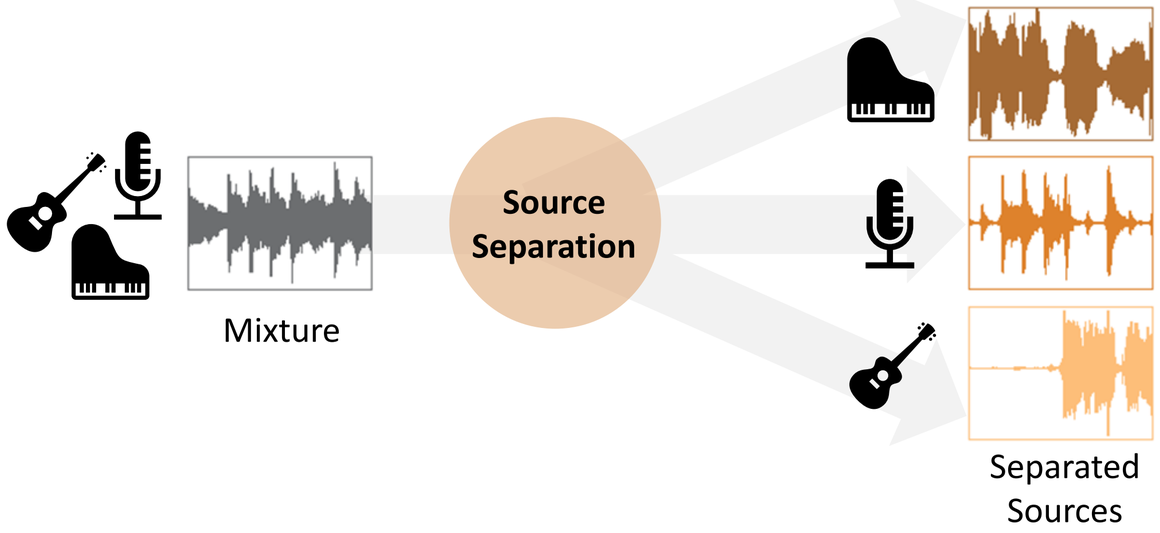
Audio Source Separation

State-of-the-art source separation from Sony that separates music and speech into individual sources.

Overview and Highlights for 2020

Objective

Separate individual sound sources from their mixture



Application

Business & services established by employing source separation

Wind Noise Filter

Restoration of Movie Classics

In-app Karaoke†

† https://www.ismir2020.net/assets/img/virtual-booth-sonycsl/Sony_demo_movie.mp4

Open-Unmix

Open-source implementation with pre-trained models

Reference implementation of music separation.

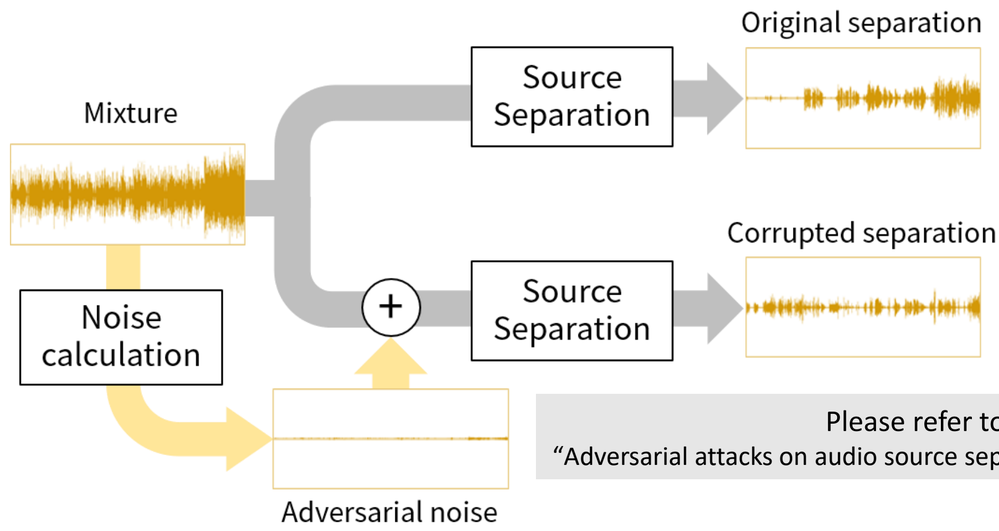
A joint **open source** work of INRIA and Sony.
(NNabla / PyTorch)

Try it out yourself!

♦♦◆ https://open.unmix.app ◆♦♦

Extension

Prevention of unauthenticated separation with adversarial noise



Please refer to our work :
“Adversarial attacks on audio source separation” [1].

Benchmark

Performance of latest Sony models (D3Net, cUMX)

Trained on MUSDB18 only

Network Architectures	Open Source	SDR†
D3Net [2]		6.01
Nachmani et. al. [3]	✔	5.82
X-UMX [4]	✔‡	5.79
Conv-TasNet[5][6]	✔	5.73
Demucs [6]	✔	5.58
Meta-TasNet [7]	✔	5.52

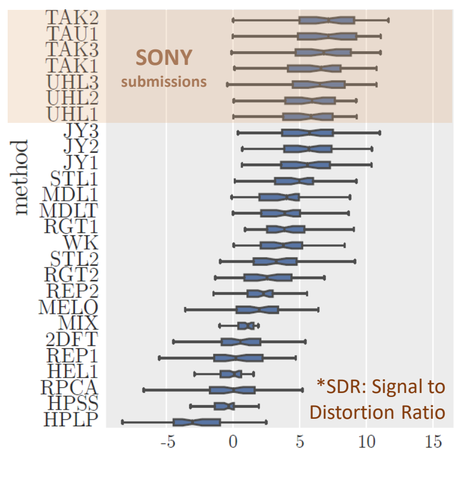
† : Averaged SDR between 4 separated sources: vocal, bass, drum and others, calculation follows the median of median convention.

‡ : Will be available online soon.

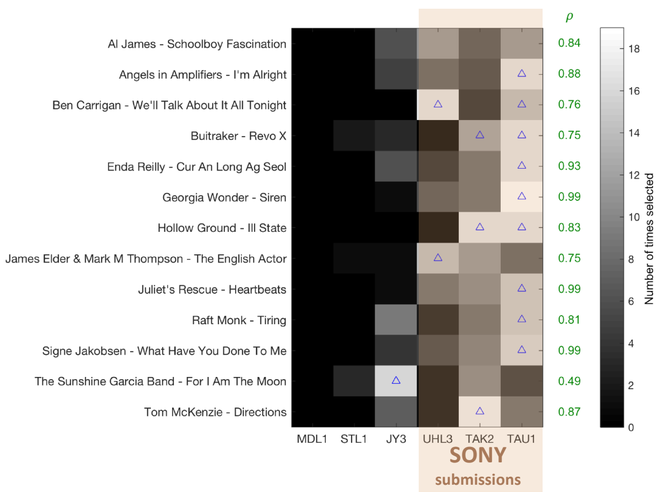
SiSEC Records

Top score in the SiSEC MUS task 3 times in a row (TAK, TAU, UHL)

SDR* of separated vocal [10]



Subjective result [11] (CC BY 4.0)



References

1. N. Takahashi, S. Inoue and Y. Mitsufuji "Adversarial attacks on audio source separation," ***arXiv preprint arXiv:2010.03164, 2020***
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5. Y. Luo and N. Mesgarani, "Conv-TasNet: Surpassing Ideal Time–Frequency Magnitude Masking for Speech Separation," ***in IEEE/ACM TASLP, vol. 27, no. 8, Aug. 2019.***
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9. R. Hennequin, A. Khlif, F. Voituret and M. Moussallam "Spleeter: A Fast And State-of-the Art Music Source Separation Tool With Pre-trained Models" ***Late-Breaking/Demo ISMIR 2019***
10. F.-R. Stöter, A. Liutkus, and N. Ito. "The 2018 Signal Separation Evaluation Campaign," ***LVA/ICA 2018***
11. D. Ward et al. "SISEC 2018: state of the art in musical audio source separation - Subjective selection of the best algorithm," ***Proceedings of the 4th Workshop on Intelligent Music Production 2018***

Sony x AI

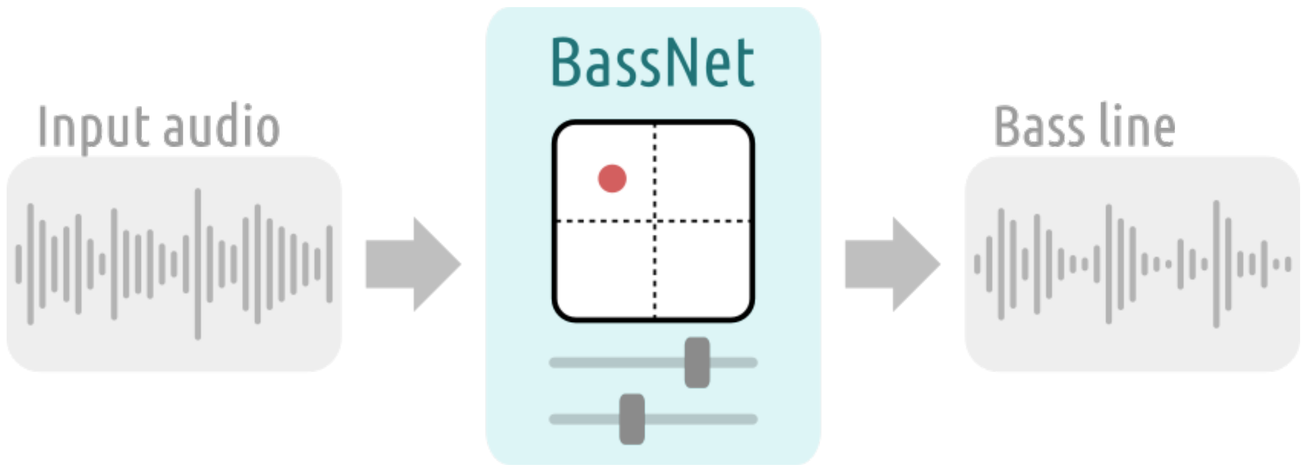
Sony CSL Music Team

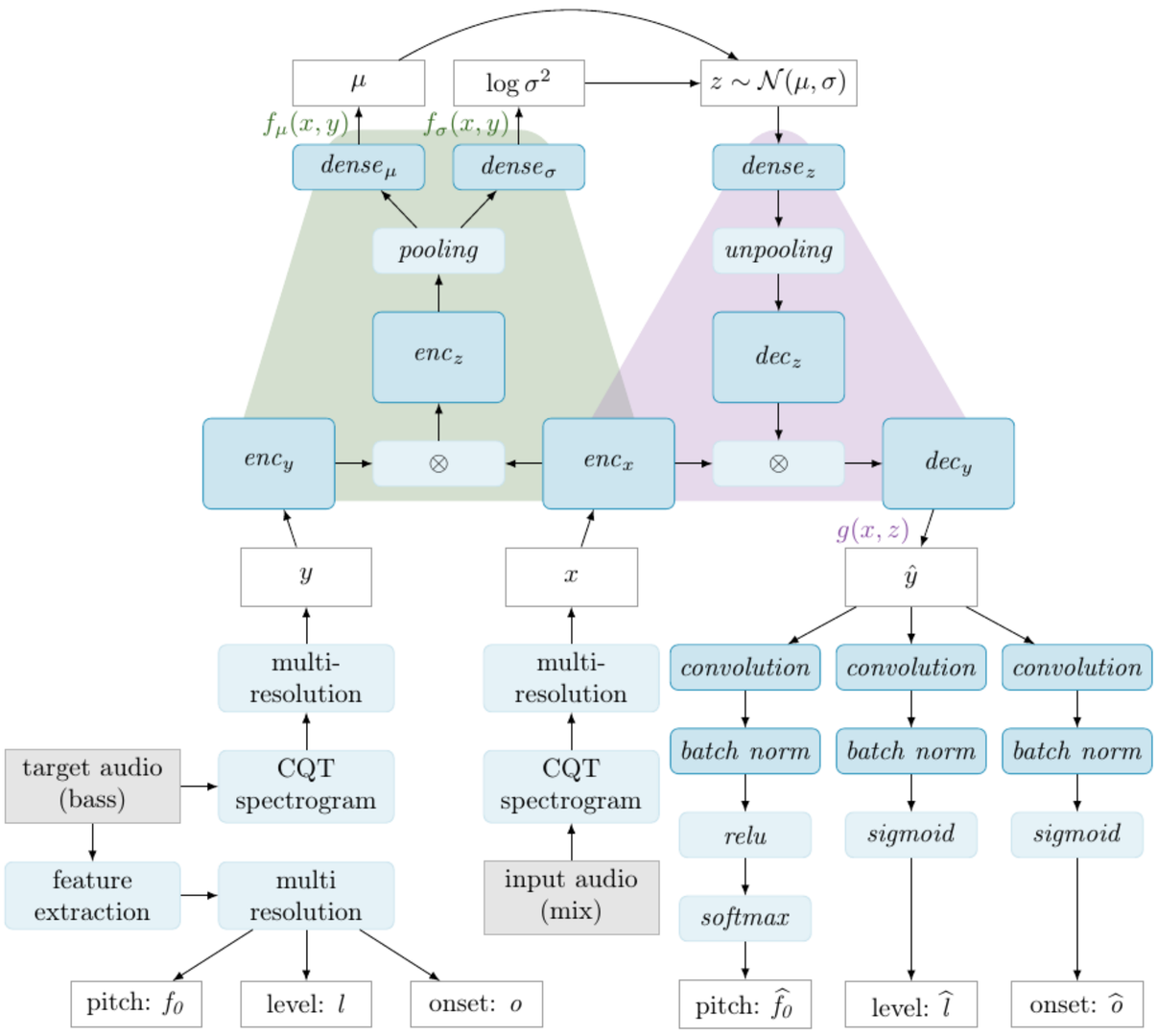
Compose music with the help of A.I. technology. We work with artists, for artists.

Highlight for Fall 2020

BassNet

A Variational Gated Autoencoder for Conditional Generation of Bass Guitar Tracks with Learned Interactive Control.





- You can input any audio.
- No restrictions on tempo or timing, BassNet follows your material.
- Explore and tweak bass lines interactively while the music is playing.
- Control note density, articulation, timbre and more.
- Export bass lines in audio and MIDI format to use in your DAW project.
- MIDI includes tuning, dynamics and pitch bend information.

M. Grachten, S. Lattner, E. Deruty (2020). BassNet: A Variational Gated Autoencoder for Conditional Generation of Bass Guitar Tracks with Learned Interactive Control. Applied Sciences, Special Issue "Deep Learning for Applications in Acoustics: Modeling, Synthesis, and Listening", 10(18):6627.

Visit bit.ly/csl-bassnet

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