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Steerable discovery of neural audio effects

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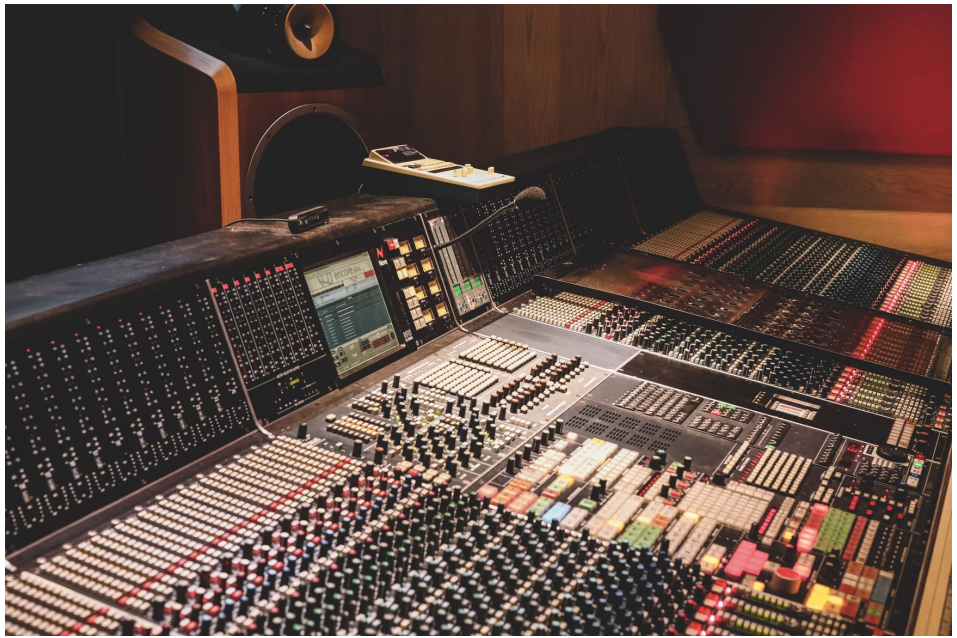
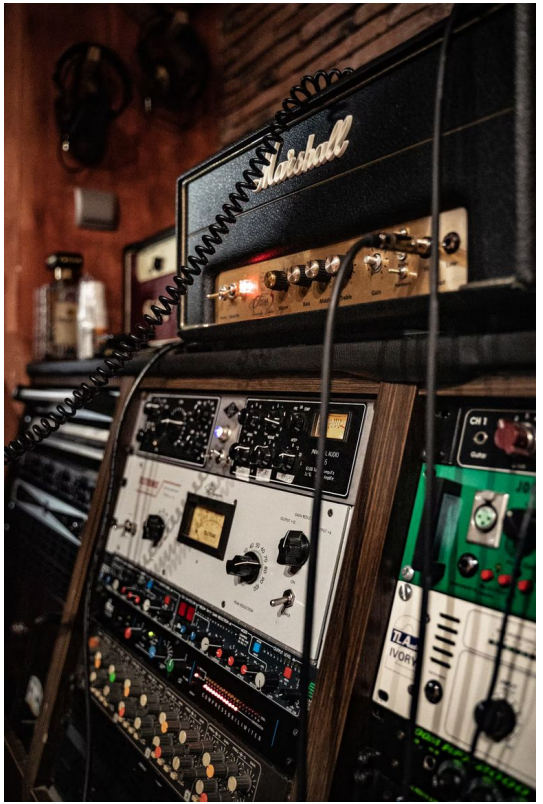
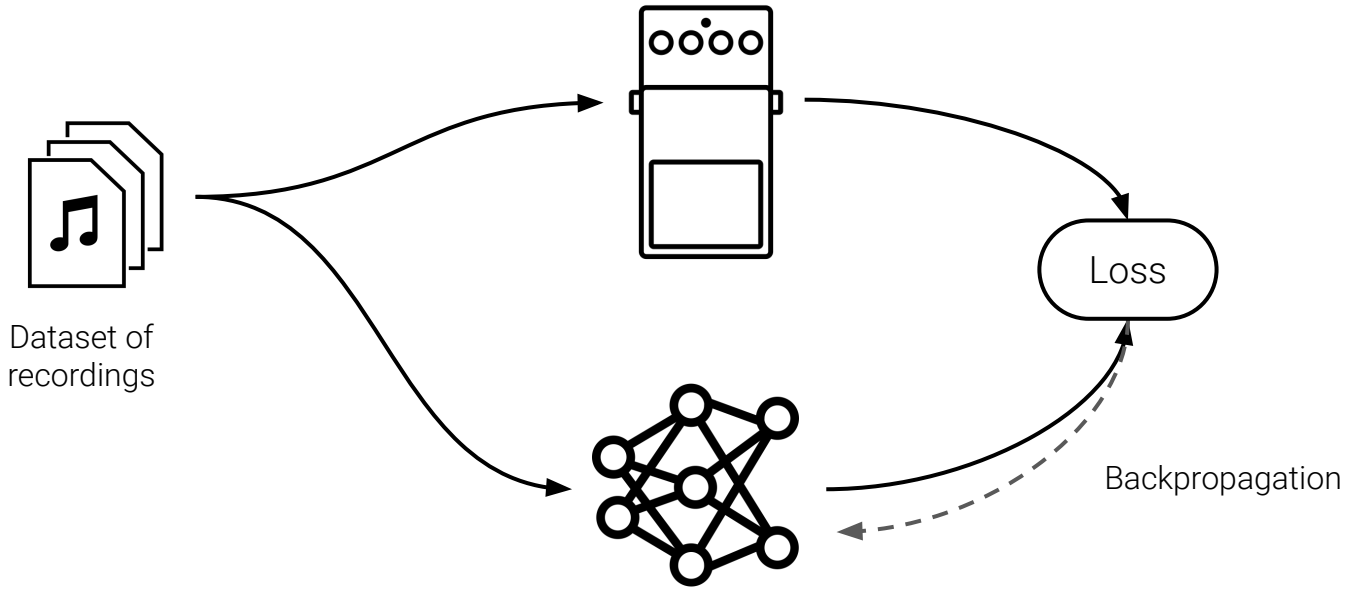
Audio Effects

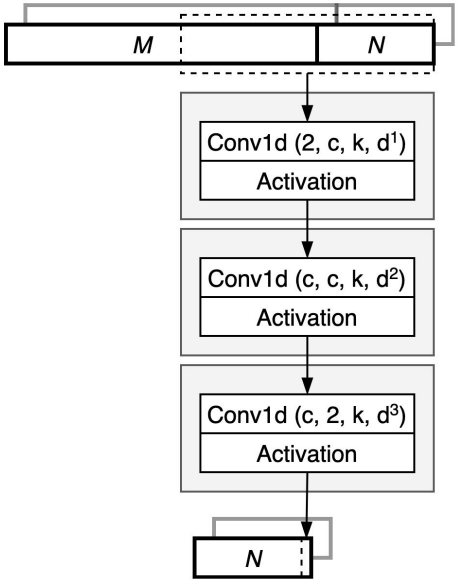


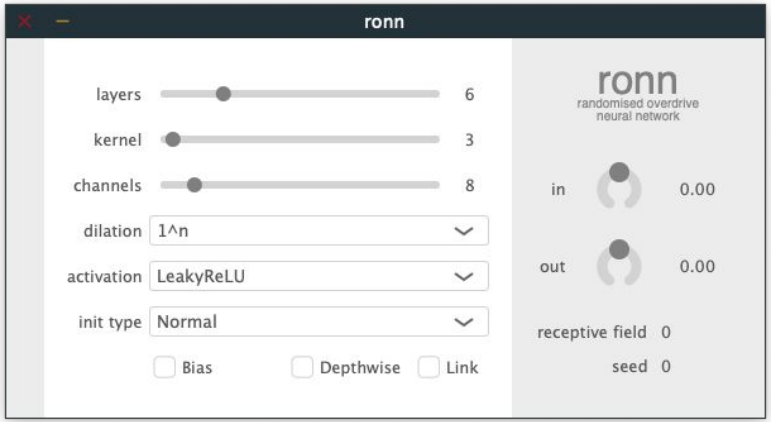


Neural Audio Effects



Randomized overdrive neural networks

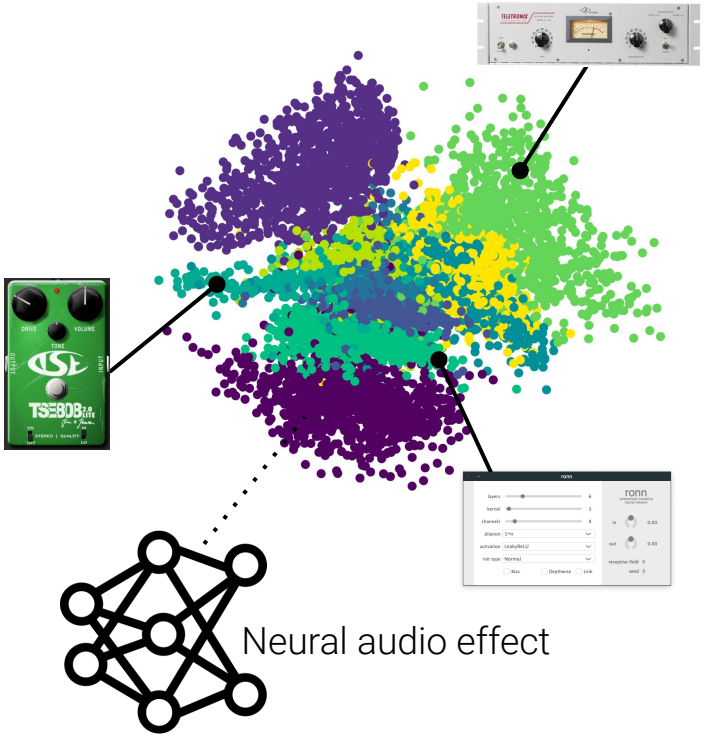




Real-time plugin built using JUCE and PyTorch C++ API (libtorch)

arxiv.org/abs/2010.04237

Weight space <-----> Effect space



Neural audio effect

EQ

Reverb

Compression

Distortion

How to better search the weight space to **discover** neural audio effects?

We propose a three step process

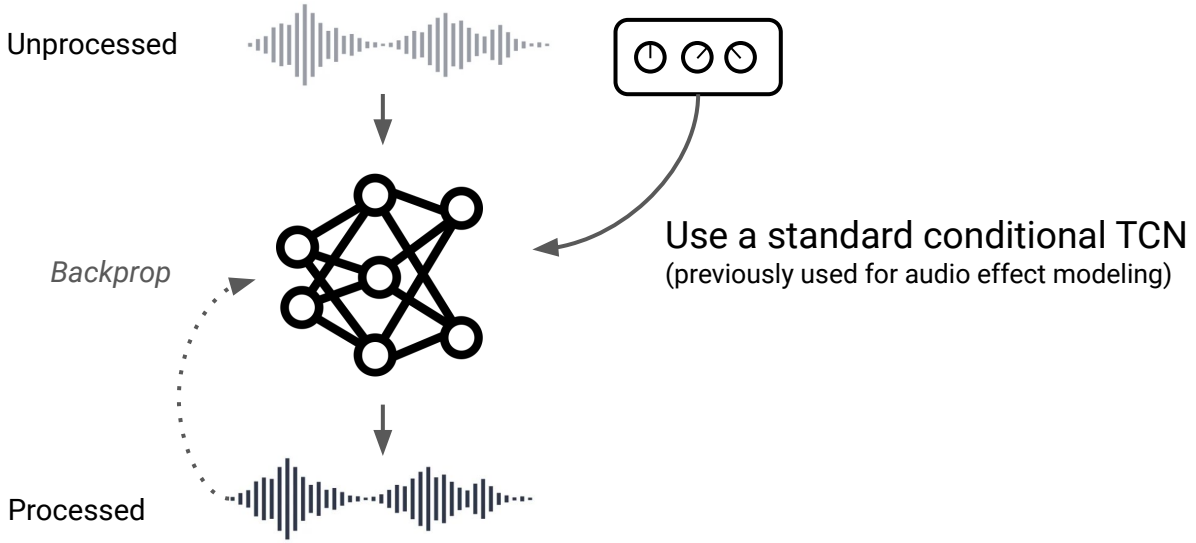
1. Generate a steering signal
2. Steer model by training for short period
3. Process new audio and adjust controls

1. Steering signal generation

Unprocessed

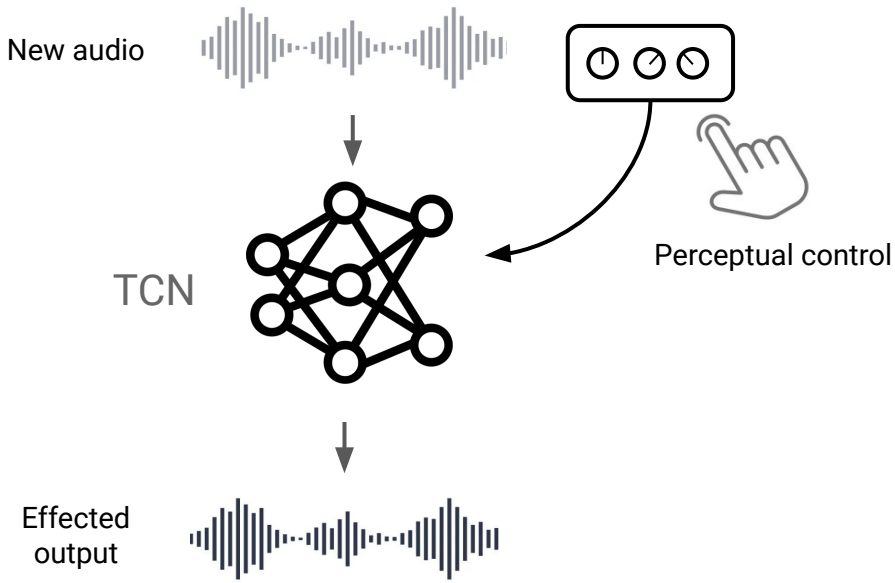
Processed

2. Steering model (training)



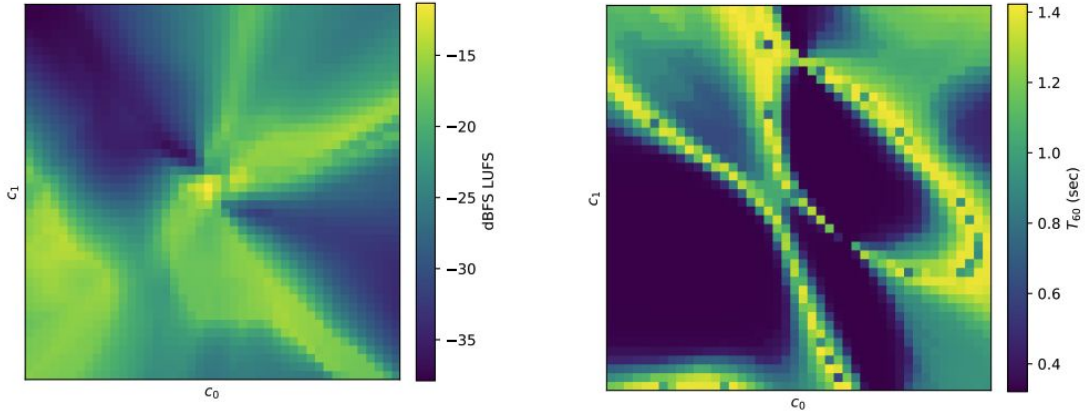
This is like training an audio effect emulation model where we “overfit” on a single example.

3. Control



Adjust the conditioning to different values (not used in training), which provides control over the effect.

Implicit perceptual controls



a) Dynamic range compressor

b) Artificial reverberation

Figure 2: Parameter space $\mathbf{c} \in \mathbb{R}^2$ from -5 to 5 with relation to a) loudness dB LUFS for a model steered with a signal from a dynamic range compressor, and b) T_{60} for a model steered with a signal from an artificial reverberation effect, both of which demonstrate clear structure.

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arXiv Webpage Code Colab Huggingface Spaces

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Attribution

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