

POLYPHONIC

Polyphonic is a performance for a prepared harpsichord and a DIY spectral modeling synthesizer. The performance is developed with the help of several machine learning approaches.

In this performance we reflect on the theme of polyphony in nature. This kind of polyphony consists of many hidden processes with no function understandable to a human. One example could be a genome: a gene expression rarely controls a single determined biological function and often affects a wide range of processes [1]. Another example could be a concept of *polyphonic assemblage* by Ann Lowenhaupt-Tsing: a gathering of intertwining ways of human and non-human being [2]. The concept is based on a wide range of post-humanistic theories.

It is hard to explore this phenomenon with a traditional deterministic toolset. Neural networks as non-human entities can give us a clue in understanding this kind of processes.

In our performance we model the situation of complex polyphony. We use autoencoder neural networks as interfaces to our instruments. We train them in evolutionary way to encode the harmonies and timbres of the source material into 5 parameters. The function of these parameters is to be explored during the performance: some combinations lead to recognizable harmonies/sounds and some lead to complex harmonic/spectral clusters. The latter is especially interesting to us to explore.

We use two types of instruments in our work:

- A prepared harpsichord controlled by a neural network. The network is trained on harmonic structure of the Well Tempered Clavier by I. S. Bach.
- A spectral modeling synthesizer controlled by another network. This network is trained on various sounds (bells, human voice, birds). In choosing of sonic material we were inspired by the baroque tradition of musical onomatopoeia.

[1] <https://ashpublications.org/blood/article/123/7/950/105652/The-polyphony-of-BACH2>

[2] <https://press.princeton.edu/books/paperback/9780691178325/the-mushroom-at-the-end-of-the-world>