BESZÁMOLÓ

MINDEN PÁLYÁZAT TÍPUS ESETÉN

(1 oldal)

Bevezetés: A tudományos program, vagy művészeti program tárgya, címe (max. 250 karakter*)

Extending musical instruments and compositional devices by means of Live Electronics and Digital Signal Processing.

A kutatási / művészeti program megvalósulása (max.1000 karakter*)

One of the main tasks that I undertook since September 2017, in order to be able to fulfill my research, was to get a deeper knowledge of the tools, technologies and scientific papers available until today in the field of Live Electronics. My interest was manifold, comprising:

1. computer analysis and recognition of a live performance (mainly rhythm-onset/beat detection and pitch-harmony-spectral data), based on several studies on the field often referred to as MIR (music information retrieval).

2. extension of the interpreter/instrument possibilities based on the analysis results by:

a. manipulation of time and pitch relations: e.g. shadow counterpoints sincronized to the player, realtime harmonization or mixture creation, pitch multiplication, just intonation and microtonal expansion.

b. timbrical/technical extensions: e.g. adding „sustain pedal" possibility to different instruments, making percussive intruments able to hold and develop its sound expressively, or changing the timbre quality during a note.

3. real-time in-place modification of the composition: e.g. improvisatory elements, constraints and chance events, elements driven by structural real-time performance.

A kutatási / művészeti program eredményei, rendezvények, publikációk, illetve publikálásra elkészült kéziratok tételes felsorolása (max. 500 karakter*)

I developed a library of patches in PureData DSP environment, named lplib, available as a zip file attachment to this paper.

I composed a piece, *Refractions* for Bass Clarinet and live electronics that features some of the tools of my research, attached to this paper.

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Also, in the Cabbage environment for Csound language, I developed a virtual instrument based on the sine-wave-oscillator superpositions in *Tonecycle 2:3:7* from Jung Hee Choi`s (disciple of La Monte Young in New York), also available as an attachment.

Az eredmények tartalmi ismertetése (max. 1000 karakter*)

The lplib PureData library contains, among others:

- An audio signal router based on a 2d multichannel mixer matrix that connects all the elements present in every custom set-up and receives and drives general preset data.

- A listener module that tracks monophonic pitch data (based on sigmund~) and performs onset detection (based on William Brent`s bark~ external). It can be further attached to another module that analyzes the rhythm based on onset detections.

- A 4-voice real-time pitch-aligned harmonizer based on pvoc~ which can be fully-driven by polyphonic midi input.

- A multisource ring modulator with the possibility of modulating the signal through a sinewave oscillator, a pitchshifted copy of the input, or an external signal.

- A spectral sound-freezer that can be midi-driven

- An adsr-module, also possibly driven by polyphonic midi input.

- A virtual string emulator, to experiment and visualize different tuning systems and divisions.

The Cabbage-Csound Tonecycle is an instrument consisting of 1 to 144 superposed wavetable oscillators that render a real-time manipulable soundscape (with an illusion of an internal moving rythm pattern, that smoothly and continously changes) by harmonic-inharmonic partial series alignment and small linear frequency deviations that produce beating patterns. It might be used in the future as a drone or a resynthesis-based complementary instrument fed from the analysis data from a live interpretation.

Az eredmények várható további hasznosítása (max. 500 karakter*)

The lplib toolbox for PureData was developed in a modular way, so it can be further expanded with new elements by anyone, being fully open source. An abstract simple base object is also provided as a template for creation of new ones.

Recently I received from my institution (LFZE) a license for using the IRCAM software tools inside Max software. My future plan is to build a more complete and robust set of tools, starting with a real-time analyzer of self-similarity in rhythm and structure in performance, and continuing by a multi-feature midi driven pitch-synchronous harmonizer.
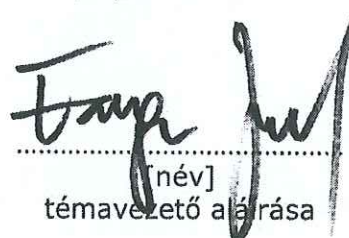
However, all of my research has reached now a point where, even if new tools will be developed, and old ones developed further, the most interesting results will truly come when applied to real compositions, not as a feature demonstration, but rather as an impulse for creativity.

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Kelt: ...*Budapest*..., *2017* (év) ...*Január*. (hónap) *29* (nap)

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pályázó aláírása

A szakmai beszámolót jóváhagyom.

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témavezető aláírása