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Contraction Point

Electroacoustic Game-Performance for Instrumentalist and Computer Music System (2015)

DESCRIPTION

Duration: 10 - 20 Minutes
Documentation: Audio Video1 Video2

"Contraction Point" integrates a human agent, a musical instrument, a performance space and a feedback delay network system. Two interconnected feedback processes take place in the "here and now". The live sound of the instrument is recorded and play-backed by 12 spatialized variable delay lines. Each delay line delays, with a maximum of 50 seconds, and transpose the incoming signal with a classic pitch shifter algorithm. The transpositions are spread symmetrically in equidistant intervals. The sound of the delay lines is physically mixed in the acoustic space, recorded by the microphone and played back again in a continuous flow. The resulted fractal sonic textures are unpredictable and unrepeatable and can be interpreted as emergent phenomena of this non-linear complex feedback process. The composed or free improvised gestures of the performer are extended in time, space and frequency, which are naturally interconnected by the feedback delay network. The process can be theoretically interpreted as the multidimensional scattering of sound inside a 10 kilometer long room, with its faces moving in variable constant speeds creating transpositions through Doppler effects.

In a parallel process, the performer attempts 12 listening walks in order to locate the speaker with the highest transposed delay line. When he/she returns to his/her instrument, he/she plays the estimated note (notes and speakers are predefined in a fixed relationship, speaker 1 → C, speaker 2 → C#, speaker 3 → D, etc). The system evaluates the input note and contracts the transposition range of the delay lines accordingly. The delay lines are then redistributed randomly in space with the only constraint that the delay line with the highest transposition will appear in all 12 loudspeakers. The interesting side effect of this process, is that with every contraction it gets more difficult for the performer to localize the loudspeaker with the highest transposition. Sound is as the only interface that interconnects the human agent, the acoustic hall and the digital system.
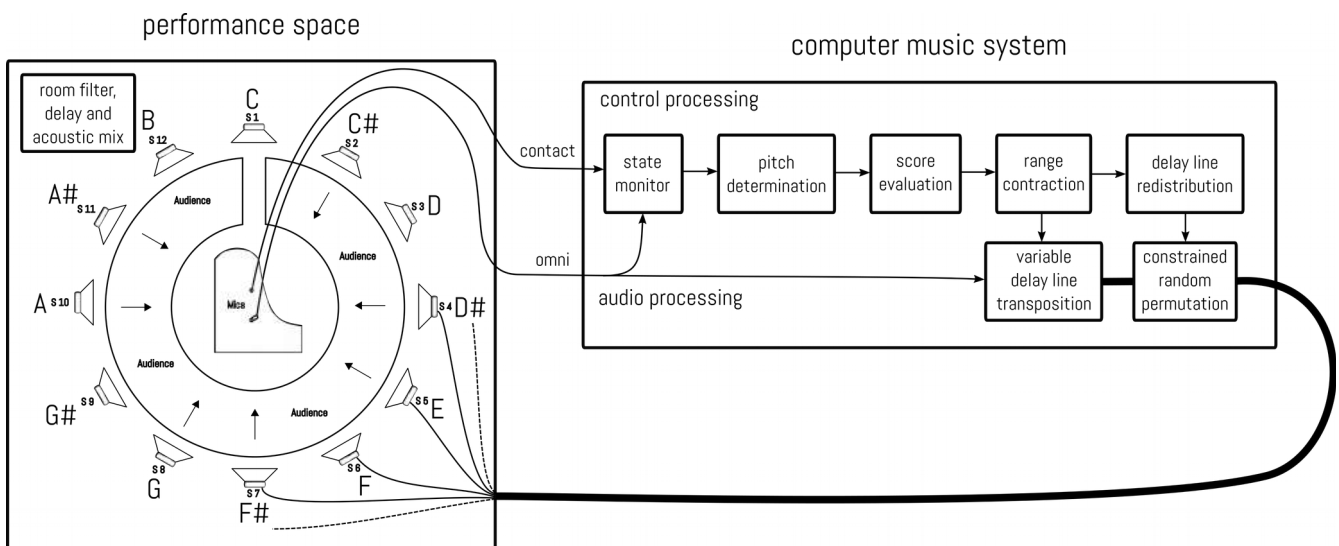

Outline of the performance space, computer music system and their interconnection.

Performing a listening walk at the "klingt gut!" Symposium on Sound in Hamburg.

After the 12th evaluation the system freezes the range contraction and reduces the window time of the delay lines. The resulting effect is the loss of sound spaciality which is gradually transformed into harmony perception. Theoretically, the 10 kilometer long room contracts to the tiny space of a resonant body of a musical instrument. The achieved game score describes the final speeds of the faces of the multidimensional resonant body, which is heard as harmonized amplification. In every performance a different game score will be achieved, leading to different resonant harmonies. If the performer achieve a perfect score (never achieved so far in any rehearsal or concert), the transposition of all delay lines will be zero and we will get just amplification of the input signal.
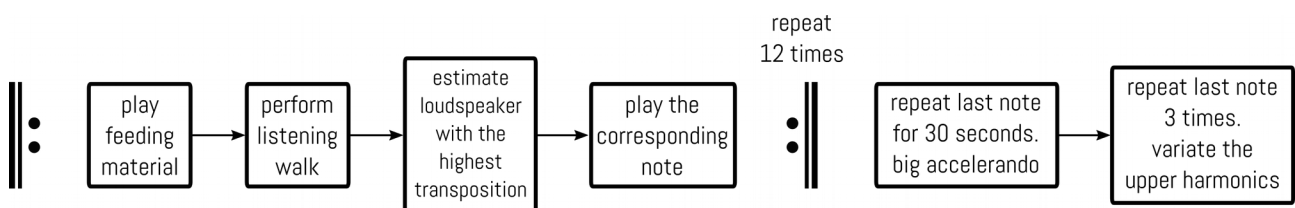

Instruction rules for the performer.

The audience is situated literally inside the performative and sound transformative process. Their physical presence influence the filtering characteristics of the room, which affects the recursive circulation of sound. The piece, which is informed by open form experiments, algorithmic composition, live-electronic and ecosystemic practices, touches also a meta-level realm. Its stated definitions enable a performance to come about, which let music arise as emergent phenomenon. The feeding material, as well as the musical instrument (acoustic, analog or digital) and playing techniques are variable and subject to the creative responsibility of the performer. Compositional elements can be prepared in advance or/and left to impulsive improvisatory actions. Very diverse performances can be composed, while all of them can be identified by the same performative and sound transformative process. Idiosyncratic and adventurous musical personalities can unprecedentedly exploit their creative potential and are invited to contribute with their original interpretations-compositions.

Performing at the "klingt gut!" Symposium on Sound in Hamburg. Photos by Stephanie Haack

A simulation of the piece with the Pure Data programming environment is currently under development. The software is recreating the acoustic conditions of the CUBE at the Institute of Electronic Music and Acoustics, where the piece was originally conceived and developed. The goal of the simulation is to allow instrumentalists to rehearse and play the game virtually, using only a microphone and headphones. This will facilitate the learning and experimentation process, minimizing logistic costs involved in the production of a performance in this initial phase.
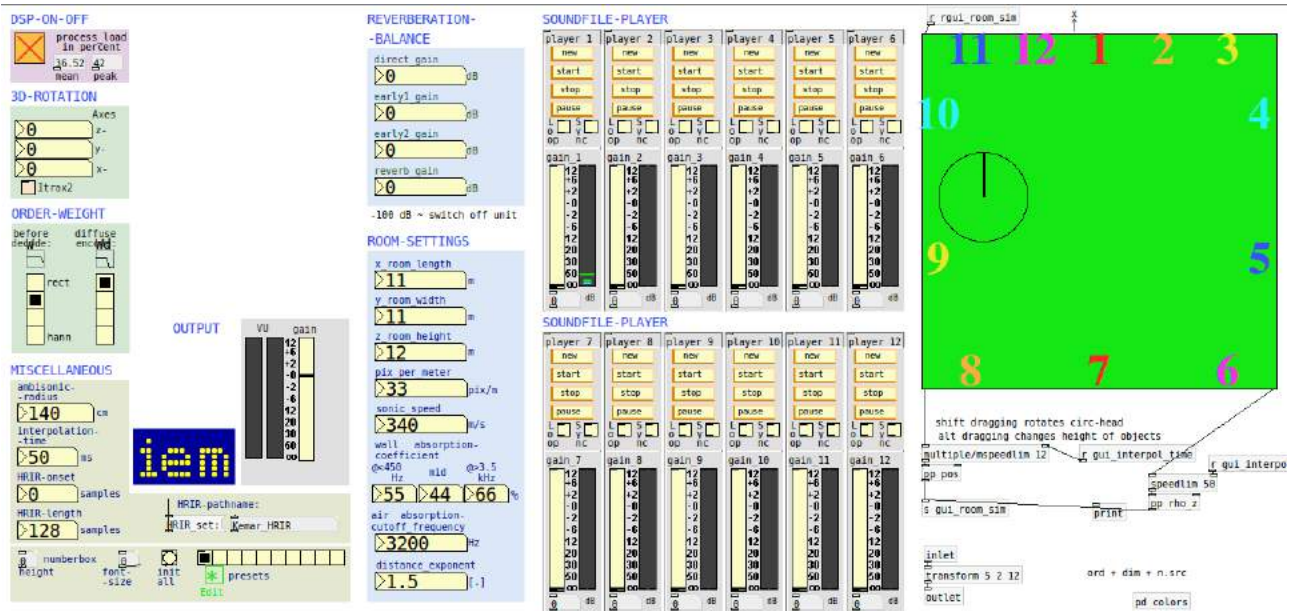
A screen-shot of the binaural ambisonic room simulation software in Pure Data.

TECHNICAL RIDER

- Flat performance area of at least 10x10 meter.
- For a performance with piano: grand piano with the permission to play with the inside strings (no additional objects, only bare hands).
- 12 or 8 full-range loudspeakers, positioned circularly at the circumference (12 speaker version is preferred).
- 1 condenser omni-directional microphone (circular setup, positioned above the piano) or 2 condenser cardioid microphones (staged setup, positioned above the piano) and 1 condenser omni-directional microphone (positioned in the middle of the concert hall).
- 1 contact microphone (positioned inside the piano).
- Audio interface and optionally mixer with 12 or 8 analog outputs and 2 or 4 analog inputs.
- Computer with Pd-extended.
- Sound check, system calibration and rehearsal: 2 hours (without speaker set up).

The setup with seated audience can have a circular (preferred) or a staged form. In the staged setup, if the piano can be positioned some meters far away from the speaker 1, only one omni-directional microphone may be used. In this case and also in the case of the circular setup, the piano lid should be removed.

circular set up   staged set up
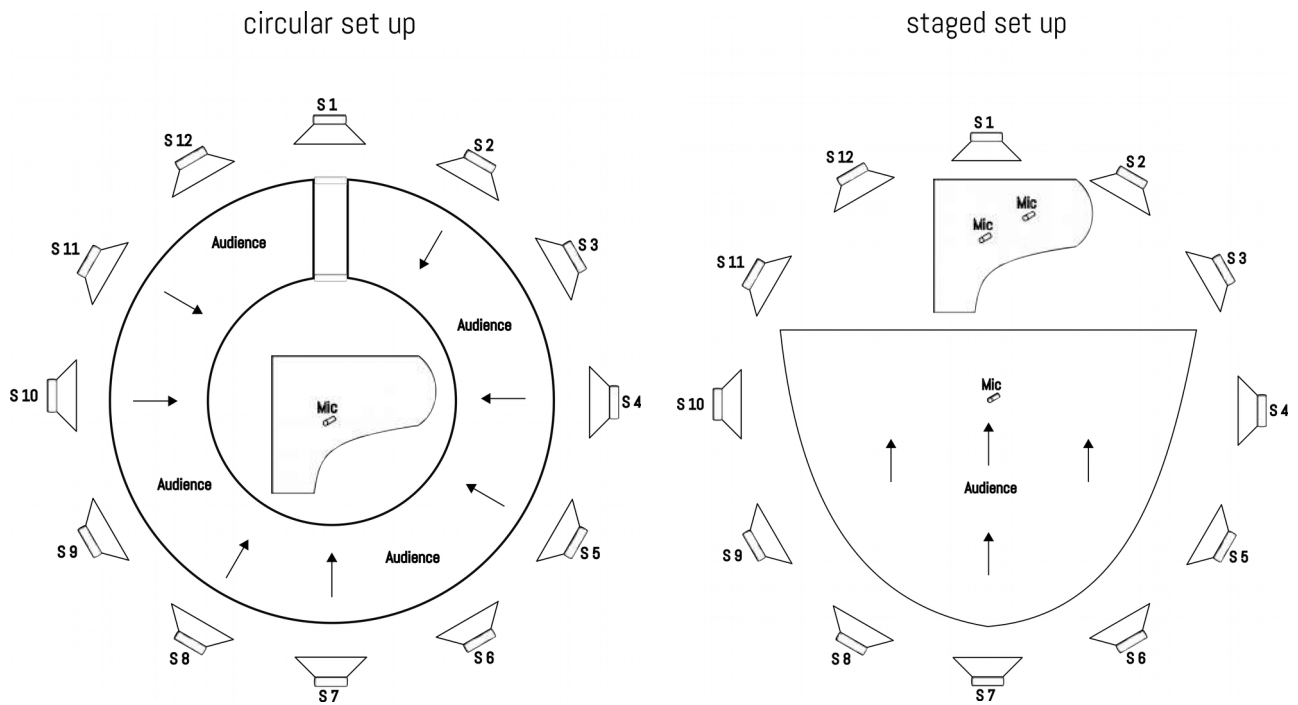
Another possibility is to set up the piece in an open space (like a foyer), position the 12 or 8 loudspeakers circularly with the instrumentalist in the middle and no chairs in between. In this setup the audience can move freely around and explore the performance as an installation. In all setups it is important to keep clear the circular corridor in front of the loudspeakers for the listening walks of the performer.

PRESENTATIONS

- Sonic Realities 2018, SERG International Postgraduate Research Conference, University of Aberdeen, United Kingdom.
- xCoAx 2017, 5th Conference on Computation, Communication, Aesthetics & X, University of Lisbon, Faculty of Fine Arts, Portugal. Joel Diegert saxophone performance.
- Open CUBE, Exploring the Extended Saxophone: New Works for Saxophone and Live Electronics, IEM, Graz, Austria. Joel Diegert saxophone performance.
- Extending Interactivity – XXI Colloquio di Informatica Musicale – Festival Spaziomusica 2016, Cittadella dei Musei, Cagliari, Italy.
- 42nd International Computer Music Conference, HKU University of the Arts Utrecht and Gaudeamus Muziekweek, TivoliVredenburg, Utrecht, Netherlands.
- Toronto International Electroacoustic Symposium 2016, Canadian Music Center, Canada.
- "klingt gut!" Symposium on Sound, University of applied sciences Hamburg, Germany - "Excellence in Art, Design and the Production of Sound".
- BEAST FEaST 2016 Real/Unreal, Birmingham ElectroAcoustic Sound Theatre, United Kingdom.
- inSonic2015 aesthetics of spatial audio in sound, music and sound art, ZKM, Karlsruhe, Germany.
- Open CUBE – Konzertreihe, IEM, Graz, Austria.
- next_generation 6.0, Kubus ZKM, Karlsruhe, Germany.