

Het Geluid van de Machine (The Sound of the Machine)

By Robert van Heumen

A composition for Disklavier, laptop-instrument and flute with electronics, performed by Shackle (Anne LaBerge on flute with electronics & Robert van Heumen on laptop-instrument)

Alternative version for Disklavier, laptop-instrument and voice, performed by Robert van Heumen (laptop-instrument) and Stephanie Pan (voice)



Introduction

The sound of machines is fascinating. They scream, growl, grind, buzz, hum, sing, roar, whistle, thunder. The Disklavier is a machine to make music with. But it's not only the strings that make sound. This composition exposes the Disklavier's mechanism and produces freshly squeezed music.

This composition is written for Shackle, the duo of Anne LaBerge on flute and electronics and Robert van Heumen on laptop-instrument. Described is also an alternative version for laptop-instrument and voice, as performed by Stephanie Pan on voice and Robert van Heumen on laptop-instrument. In fact, the composition can be performed in various versions: tape only, Disklavier & tape, Disklavier, tape & one performer, Disklavier, tape & two performers.

The composition consists of three sections:

1. Huilen ruisen: tape and Disklavier only, exposing the mechanism
2. Grommend schreeuwen: feature section for the live players
3. Zoet zingen: a movement of noise into melody, ending with the sound of the piano

All sounds heard on the tape are derived from the Disklavier. Flute, voice and live sampling of those instruments by the laptop-instrumentalist are used to bridge the gap between tonal material from the piano and mechanical sounds from the mechanism of the Disklavier. There is a general movement from noise to the sound of the piano. The idea is to have melody slowly coming through the surface of a sea of noise.

Het Geluid van de Machine is commissioned by the Conlon Foundation and the Gaudeamus Muziekweek and made possible through a grant by the Performing Arts Fund NL and support from STEIM.

The composition is performed on the following dates:

- September 8, 2011 (premiere) Museum Speelklok, Utrecht, performed by Shackle: Anne LaBerge (flute/electronics) & Robert van Heumen (laptop-instrument)
- Oktober 23, 2011 Museum van Bommel van Dam, Venlo (alternative version), performed by Robert van Heumen (laptop-instrument) and Stephanie Pan (voice)
- November 13, 2011 NovemberMusic, Den Bosch (alternative version), performed by Robert van Heumen (laptop-instrument) and Stephanie Pan (voice)

It will also be added to the repertoire of Shackle, possibly to be performed during their Australia tour in 2012.

Development

The development of Het Geluid van de Machine was done in 4 phases:

1. The Disklavier score

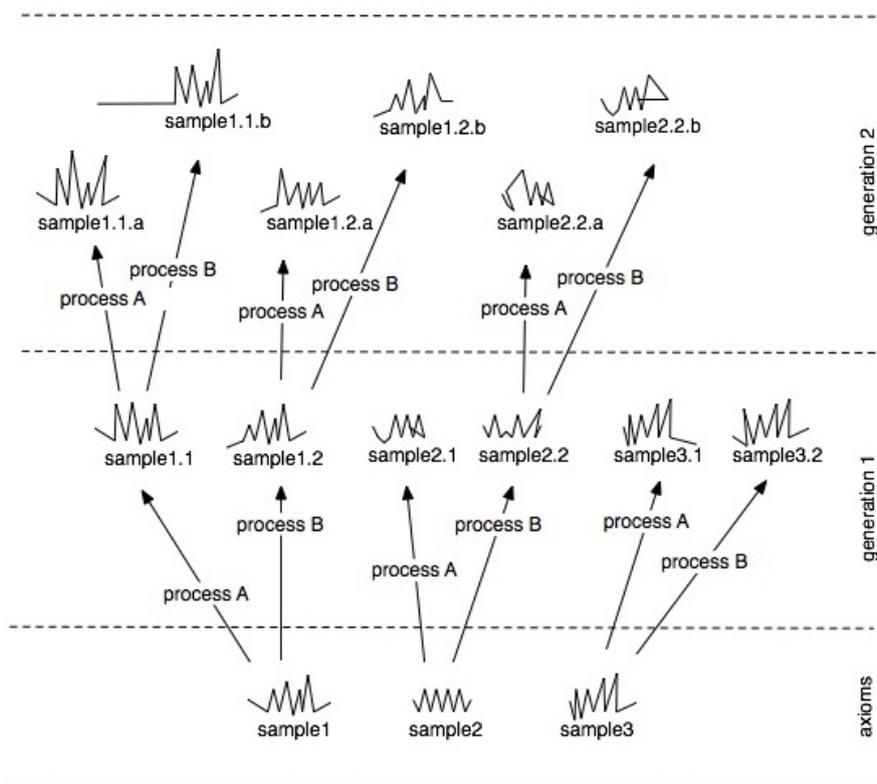
First a song was written, called Dreamlife, and various versions and derivatives were constructed. This material was used to compose the Disklavier score.

2. The tape

Contact microphones and acoustic microphones were used to retrieve samples from the Disklavier. For the tonal material, the Disklavier score was used. The sounds of the mechanism were recorded using various techniques:

- a. Holding down 10 keys at the same time for a sustained period: this generates a high frequency buzzing sound as heard in the first section of the composition.
- b. Playing some of the material from phase 1 in 'silent mode', where the mechanism is triggered but the strings are not heard.
- c. Playing very dense clusters of notes on the Disklavier, which makes the keys hit the strings only sometimes, creating the rattling, fuzzy melodic material as heard in the last section of the composition.

With this soundmaterial as a basis ('axioms'), a family tree of derivatives was constructed. The iterative processing of the axioms into a tree of sounds was done through my laptop-instrument. Below is a schematic representation of a family tree with 3 axioms.



This material was used to compose the tape.

3. The live instrument score

The 'score' for the live instruments was not notated as a traditional score, but defined as musical sections, which can be improvised within certain constraints. In the cue list further on in this documentation, these constraints can be read. They were developed working closely with the first two performers: Anne LaBerge and myself. Most of the constraints describe

balancing between tonal and non-tonal material.

4. The software

Finally, the software to connect all these parts was written in SuperCollider. The program consists of two parts: the main program to play the tape, send the MIDI data to the Disklavier, show the cues to the laptop performer and send the cues over a network to the other part, the client program. This client program runs on a second computer, presenting the cues to the acoustic performer. Below is a detailed description of both parts.

Description of the software

This is a description of the SuperCollider programs to run Het Geluid van de Machine. For guidelines for installation and setup of the SuperCollider environment see the performance notes below.



This is the main program that runs the tape part, sends MIDI to the Disklavier and presents the cues to the laptop player. It also sends data over the network to the client program to display the cues to the acoustic player. The big empty rectangle will show the cues, the smaller empty rectangle the countdown of the cues. Also shown is a clock that counts the absolute time in the piece. The window is formatted to fit on an iPod Touch or iPhone, so the laptop player can use for example the third party software Air Display to extend his laptop screen and place this window on the iPod.

Start: this button starts and stops playback of the composition.

Start from: here one can select 4 different starting points, useful for rehearsals

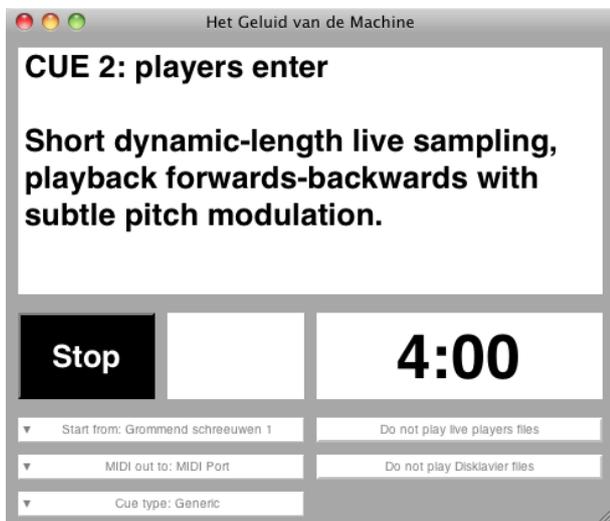
MIDI out to: this specifies where the MIDI for the Disklavier will be send

Cue type: here one can choose 3 different presets of cues to display and send over the network ('Generic' for unspecified live instruments, 'Shackle' for specific Shackle cues and 'Shackle-voice' for the alternative version for voice). The 'Generic' preset lists only cues for the laptop player, and it is the idea that the laptop player runs this version on his computer.

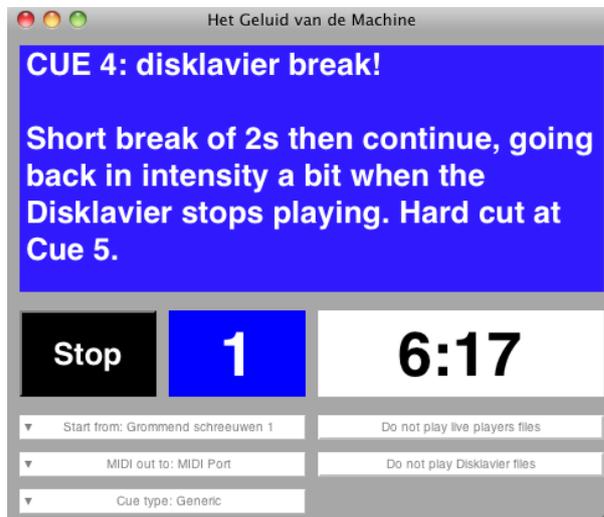
Do not play live players files: with this button one can engage playback of recordings of live players in case only one of no live player is available. Audio files provided are recordings of Shackle, but these can be replaced by other recordings (see performance notes for more details).

Do not play Disklavier files: with this button one can engage playback of recordings of the Disklavier score, in case no Disklavier is available.

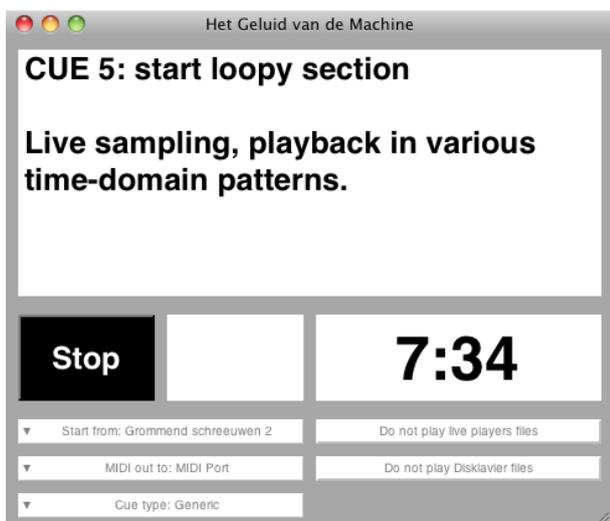
Some screenshots of the main program in various stages:



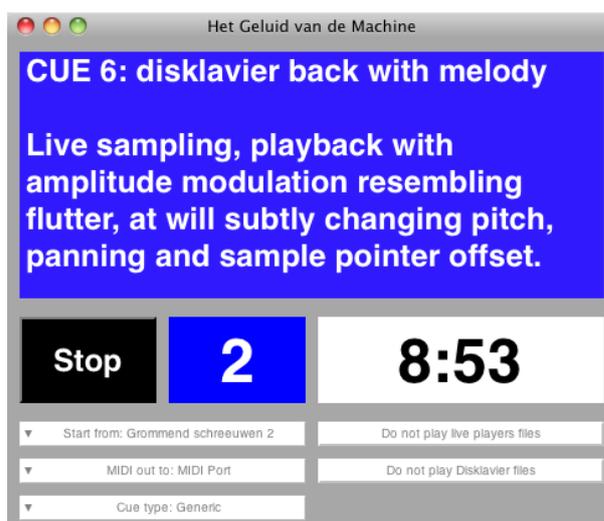
Cue 2 is active, 4 min in the piece.



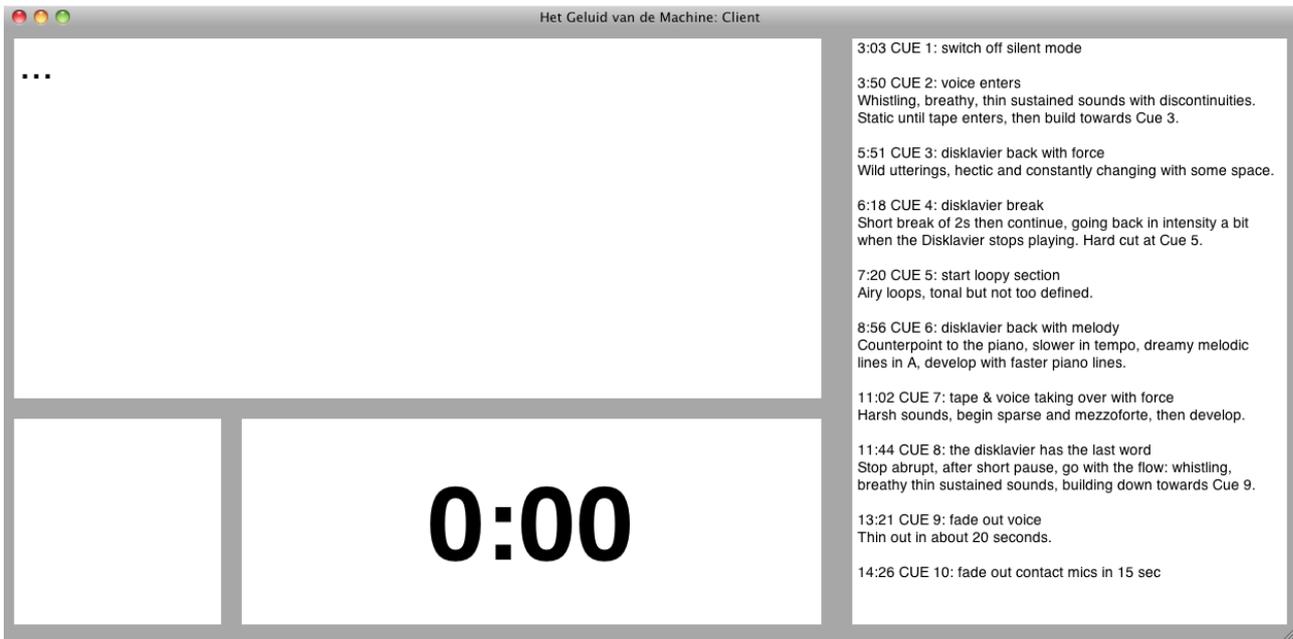
The cue and countdown section turn blue when counting down.



Cue 5 is active, 7:34 min in the piece.

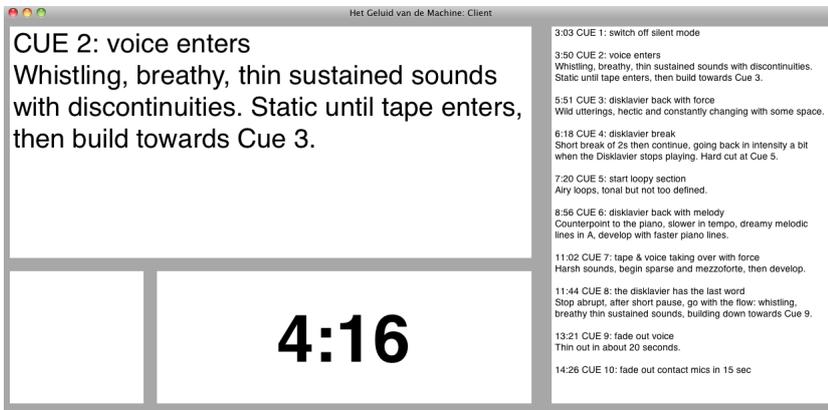


Counting down to cue 6.

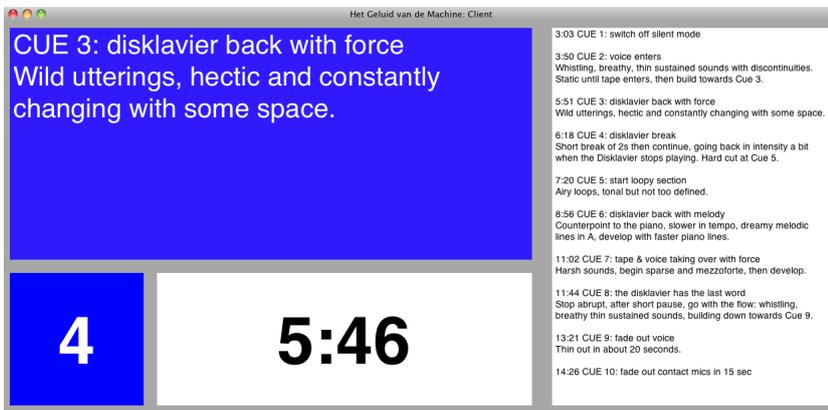


This is the client program, that receives the cues from the main program. The big empty rectangle will show the cues, the smaller empty rectangle the countdown of the cues. Also shown is a clock that counts the absolute time in the piece. On the right the (static) full list of cues is shown, especially useful for rehearsals. The window is bigger than that of the main program, as generally this program will be a bit further from the acoustic player, so it has to be big enough to be readable.

Some screenshots of the client program in various stages:



Cue 2 is active, 4:16 min in the piece.



Countdown to cue 3.

Performance notes

Disklavier Setup

- The two contact microphones (brand: Schaller) are attached to the metal beam underneath the piano, one left and one right, using a layer of about 2-3 mm of putty to attach it. On both sides there are cables to assist in keeping the microphones in place. Jack connectors from the contact mics go into the Samson DI box, with the gtr/spk switch set to 'gtr' (which gives the loudest output level). Then the DI box goes into two microphone channels on the Mackie, with the low cut button engaged and on the EQ the low frequencies taken out completely. Trim should be kinda halfway, same for the gain and the main mix level, as a starting point. The contact mics should be as loud as possible without feeding back and with the noise level within reason, but of course in balance with the tape, the live players and the acoustic sound from the Disklavier. The Mackie main outputs go to the FoH system.
- The Disklavier should be acoustically amplified so as to mix well with the tape.
- Settings on the Disklavier (using the Func button to go into the menu, except for volume):
 - Silent mode: keys on
 - Delay: 500 ms
 - MIDI input channel: 1
 - Set de volume knob to 0
- If MIDI doesn't seem to reach the Disklavier check the following: on the back of the MIDI interface on the Disklavier there is a 'to host' switch. This one should be set to 'MIDI'.
- Before the concert, switch off the Disklavier for 10 seconds, then switch on again.
- With the box under the piano keyboard, on the left, the silent mode can be switched on and off. At the start of the composition, this switch should be engaged (so silent mode is on, meaning triggering MIDI notes activates the mechanism but not the stings).

SuperCollider installation

- This section assumes that the installation package is downloaded.
- To install SuperCollider, unzip SuperCollider 3.4.2.zip into the Applications folder, scwork.zip into the users folder (~/) and SuperCollider.zip into ~/Library/Application Support/.
- Because of a bug in the SC software, go to the folder ~/Library/Application Support/SuperCollider/Extensions/quarks/, double-click the two aliases in that folder, and repair them by selecting the similarly named files in ~/Library/Application Support/SuperCollider/quarks/.
- Note 1: The folder ~/scwork/GvdM/live/ contains files with recordings of Shackle. In the interface of the program one can choose to play these files to perform a Disklavier & tape version without any live players.
- Note 2: The folder ~/scwork/GvdM/Disklavier/ contains files with recordings of the Disklavier. In the interface of the program file one can choose to play these files, in case a Disklavier is not available.

SuperCollider setup

- To start the piece, follow the guidelines in the program file GvdMplay_v2.2.rtf. Make sure the correct MIDI output is selected.
- In the master and client files, it is assumed that there is a network connection between the 2 computers, where the master computer has IP address 10.0.0.1 and the client computer has IP address 10.0.0.2.
- To 'refresh' SuperCollider, use apple-K or just simply restart the program.
- Information about the SC environment and the server that plays the audio/midi can be read in the post window (the blue window on the right).
- In case the SC server doesn't start (which would be mentioned in the postwindow) it's probably because there is a hanging SC server. Quit SC, start the Activity Monitor in OS X and force-quit all 'scsynth' processes.
- SC will playback on the default audio output as set in the OS X Audio Midi settings.

Cues for the performers

NB1: live sampling applies to the acoustic player, not to the Disklavier.

NB2: in general use abstract sound, for voice fake-language is permitted, but no 'real' words.

0:00 Cue 0: start the piece.

3:03 Cue 1: switch off silent mode.

3:50 Cue 2: players enter

Acoustic (refers to the generic case with no acoustic instrument specified): Whistling, breathy, thin sustained sounds with discontinuities. Static until tape enters at 5:10, then build towards Cue 3.

Flute: Whistle tones with Nord gates, multiphonic fingerings (1'20" sustain then 40" more active, building towards Cue 3).

Laptop: Short dynamic-length live sampling, playback forwards-backwards with subtle pitch modulation.

5:51 Cue 3: disklavier coming back in with force

Acoustic: Wild utterings, hectic and constantly changing with some space.

Flute: Wild flute with multiphonics and glisses, Nord Thimble.

Laptop: Short dynamic-length live sampling, playback with sample pointer offset modulation and forwards-backwards with subtle pitch modulation.

6:18 Cue 4: break!

All: Short break of 2s then continue, until hard cut at Cue 5.

7:20 Cue 5: start loopy section

Acoustic: Abstract airy loops, tonal but not too defined in timbre. Like weaving or wind through a tube.

Flute: Acoustic loops - 16ths airy tone.

Laptop: Live sampling, playback in various time-domain patterns.

8:56 Cue 6: disklavier coming back in with melody

Acoustic: Counterpoint to the piano, slower in tempo, dreamy humming or growling repetitive melodic lines in A, more open with faster piano lines (3 sections of 40s each).

Flute: Acoustic with bass line, develops rhythmically into flutter in A (3 sections of 0'40 each, develop with faster piano lines).

Laptop: Live sampling, playback with amplitude modulation resembling flutter, at will subtly changing pitch, panning and sample pointer offset.

11:02 Cue 7: tape & players taking over with force

Acoustic: Harsh sounds, begin sparse and mezzoforte, then grow more dense and noisier.

Flute: [tk] [tk] airy. Begin sparse and develop adding [n].

Laptop: Short dynamic-length live sampling, playback with sample pointer offset modulation and forwards-backwards with subtle pitch modulation.

11:44 Cue 8: the disklavier has the last word

All: stop abrupt, after short pause, go with the flow.

Acoustic: Whistling, breathy, thin sustained sounds, building down towards Cue 9.

Flute: Whistle tones with Nord gates, multiphonic fingerings, subtle and little development.

Laptop: Short dynamic-length live sampling, playback forwards-backwards with subtle pitch modulation.

13:21 Cue 9: players stop

Acoustic: Thin out in about 20 seconds.

Flute: Slowly fade out acoustically.

Laptop: Stop.

14:26 Cue 10: fade out contact mics in 15 sec.