A Report on performing Voi(Rex) in 2014

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1 Introduction

This is a report on the subsequent preparation and performance of the live electronics for Philippe Leroux' composition Voi(Rex). The motivation to document the author's experiences was his performance of the piece in three concerts and one public rehearsal with the Swedish ensemble Norbotten NEO, soloist Donatienne Michel-Dansac and Pierre-André Valade in 2014. This report is intended as an aide for live electronic musicians wanting to perform the piece and can be considered as an add-on to the Billaudot score and the IRCAM documentation distributed with the performance materiel and software. The author welcomes all corrections, comments and extensions.

2 Sound Engineering Considerations

2.1 Microphones

All instruments of the ensemble were slightly amplified in order to achieve a good blend with the vocal and the electronic parts as well as to emphasize details of the ensemble instruments. The author and the vocalist agreed to not use two microphones for the voice and rely on a single neck-worn lavalier microphone via a wireless belt-pack transmitter as it nicely captured all details of the vocal part very well. The same microphone provided the input to the live electronics software.

In the performance the vocal microphone can be muted from bar 180 to bar 256 to allow the vocalist to clear the throat.

2.2 Loudspeakers

The placement of the loudspeakers as indicated in the score is a surround six-channel layout, with a seventh speaker off-stage and the eight on the center of the stage. Loudspeakers number one and two were used for the amplification of the instruments and the voice. The author achieved a good coverage of the four loudspeakers surrounding the audience by putting them on very high loudspeaker stands or on the concert hall balcony. These surround speakers were optionally angled slightly upwards to prevent audience members sitting close to these speakers from being exposed to a too high sound pressure level.

The placement of loudspeaker seven requires some consideration and interpretation by the live electronics musician. The world premiere of the piece was given in the Espace de Projection at IRCAM, with that loudspeaker most likely

placed in one of the little rooms to the side of the stage while having its doors open. The opening bars of Voi(Rex) feature an interplay between the live vocal and its recorded and reproduced version. In the world premiere this shift between the vocal and its reproduced counterpart were accompanied by variable stage lighting and featured the vocalist slowly turning herself from facing the side wall, and hence loudspeaker seven, towards the audience in the opening bars. Under circumstances where such a setup with off-stage room to the side and variable stage light are not realizable, the author chose to have loudspeaker seven on the stage, but facing towards the wall behind the stage, achieving an indirect sound radiation. The level and perceivable presence of loudspeaker seven are in all cases very dependent on the placement and orientation of the speaker and the concert hall layout and acoustics. It is recommended to establish a good sonic balance with the other loudspeakers to allow for a smooth transition between amplified vocal from speakers one and two and the indirect or off-stage loudspeaker seven.

Loudspeaker number eight was placed on stage behind the ensemble and lifted on its stand to project above the musicians towards the audience. It is especially present in movement 1, cue 19 (M1-C19).

2.3 Differences between the electronics in the score and as implemented in the patch

The score of Voi(Rex) was printed before the premiere of the piece and was not revised as of 2014. As the Max/MSP patch for the piece was most likely completed after the score was printed, there are some inconsistencies between patch and score. It is advisable to inspect all cues inside the patch in order to learn about their real actions. The patch as distributed by IRCAM can be largely considered to have prevalence over the score. Please see the additional comments below for more considerations.

3 Computer Music Patch

3.1 Hardware and software versions

In the performances documented here the patch was the Max6 version distributed by IRCAM in 2014 with modifications and additions by the author. It was employed on an early 2009 MacBook Pro running OS X 10.6.8 with an RME HDSP Multiface and Max/MSP version 6.1.6.

3.2 Hand-held Switch

For the execution of the cues by the vocalist the author constructed a hand-held double-pole single-throw (DPST) switch with redundant electrical connections as depicted in figure 1. The actual switch model was selected due to its clear haptic feedback and mechanical hysteresis when depressed, thus preventing accidental execution. The switch was connected to a MIDI faderbox at the front-of-house position using an XLR microphone cable. The MIDI faderbox featured an analog input for a sustain pedal which was employed to convert the depression of the switch into a MIDI continuous controller (CC) command.

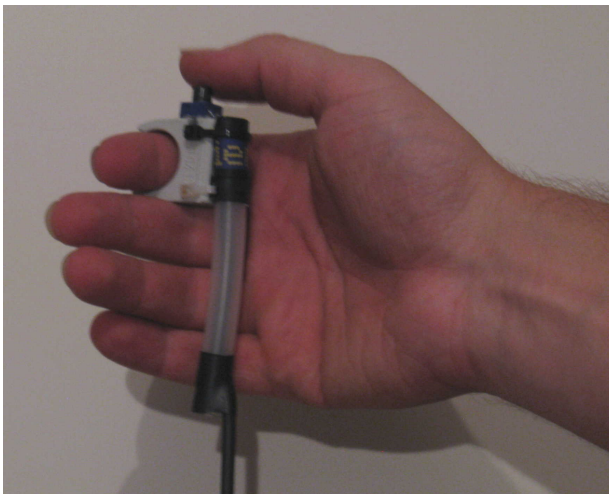

Fig. 1: Hand-held switch

3.3 Stage Computer

Visual feedback about the execution of the cues for the vocalist was provided by a laptop computer on stage running a Pure Data patch indicating the triggered movement and cue numbers as shown in figure 2. This patch received messages from the main Max/MSP computer via an ethernet network cable connection. The stage computer should have its screen saver and power saving functions disabled. The author's modification to the Max/MSP patch include the respective *udpsend* and *udpreceive* objects. Furthermore a function periodically sending a data packet to the stage computer, and having it returned from there, indicates a live network connection in both patches. The Pd patch used the *udpsend* and *udpreceive* objects along with their corresponding *unpackOSC* and *packOSC* counterparts.

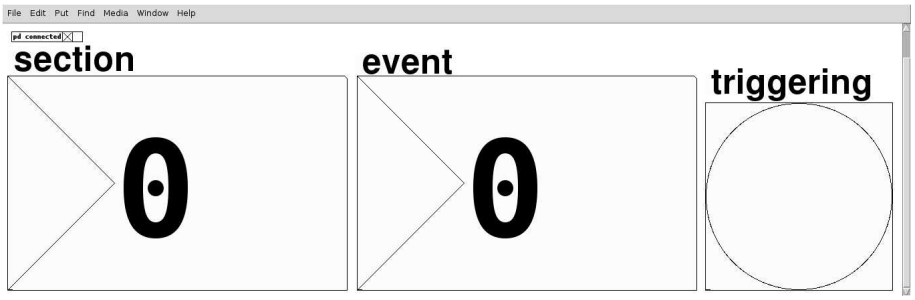

Fig. 2: Visual feedback of cue execution via a Pure Data patch

3.4 Faderbox

In addition to converting the hand-held switch to MIDI messages, the faderbox was used to provide certain controls to the live electronic musician. Buttons

permitted to trigger a cue and stop all actions as well as to step forward and backward through movement and cue numbers. A function to automatically cue-in the respective cue number after a certain time span has elapsed without the cue number being changed has proved helpful.

Additional visual feedback of the execution of a cue was provided by having all LED rings around the faderbox rotary encoders flash briefly. This flash which can be detected out of the corner of one's eye while following the score.

The author performed Voi(Rex) with his left hand on a mixing desk fader controlling the amplification of the voice and his right hand on the faders controlling the patch output volumes. A possible future modification not yet implemented would be to have the patch volume control faders resemble the behavior and characteristics of a mixing desk fader more closely.

Since the patch was entirely controlled from the fader box, all computer keyboard shortcuts were disabled.

3.5 Redundant setup using two audio computers

Higher reliability of the electronics setup was achieved by using two laptop computers running identical copies of the patch and having duplicate audio connections from and to the mixing desk. Since the patch was controlled by a faderbox with two MIDI outputs sending identical messages, the two instances of the patch were always synchronized. A mute group on the mixing desk allowed to switch between these two computers with a single switch at any time. See figure 3 for an example of this setup.

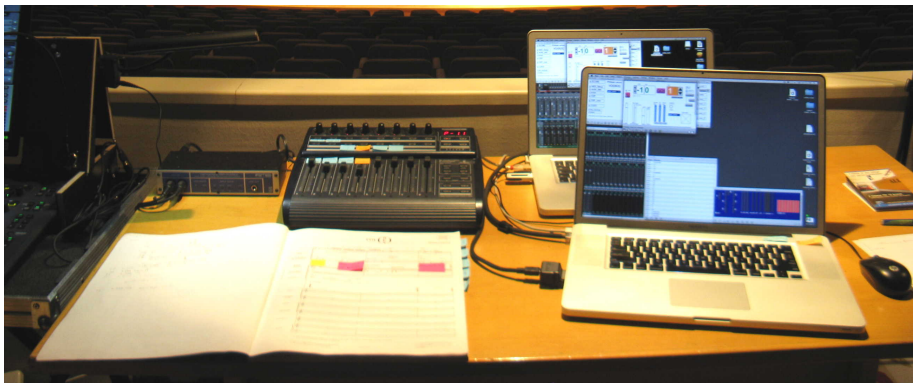

Fig. 3: Setup with redundant audio computers and faderbox, with audio mixing desk to the left of the table.

3.6 Critical problems

Two critical problems at initialization of the patch were encountered.

The initialization of the patch in its [DSP_cmd] window did cause a lockup of Max/MSP, eternally displaying an OS X "busy ball". Disconnecting the fifth message inside the [INIT] subpatch, which sends settings to a message receivers "dsp" and "max", did prevent this from happening. Since this only happened on one of two computers this might be a problem related to slightly different audio

interfaces and/or operating system versions and does not necessarily mean an issue with the patch itself.

The same initialization would occasionally make the *reverb8~* object send a constant DC signal at 0dBFS to the DACs. Since *reverb8~* is a delay feedback network reverberator an unstable internal state is suspected to cause this behavior.

3.7 Patch volume controls

The following comments are intended to clarify the function of the volume controls available to the live electronics musician.

The volume control slider *RT gain* does not affect the playback of the voice recorded live in the opening bars of the piece as the patch uses the general sample playback objects for this task. Their output is evidently controlled by the *Sampler gain* slider.

The volume control *RT gain* does not affect the reverb tail in the very last cue as it is produced by the spat object, which is positioned later in the signal chain.

3.8 Modification

To prevent accidental clipping of the patch outputs eight limiters were included just before the *dac~* objects, with their gain reduction being displayed in the [VUs] subpatch.

Harmonizer objects *harmv2~* from the CNMAT MMJD collection were used instead of the *fharmv2~* objects provided with the patch in order to work around some audible clicks when the phase of one of the variable delay lines inside the harmonizer would wrap around. Since the CNMAT objects take identical parameter messages, a simple exchange of the objects was feasible.

The panning between loudspeakers one and two in (M5-C4) to (M5-C8) was enhanced to better correspond to the instructions in the score.

A selective amplification of the voice by the patch itself in (M1-C12) was removed by the author and performed on the mixing desk by hand. Please refer to the vocal part in the score to determine which notes benefit from a stronger amplification.

Additional amplification of the voice by the patch itself in (M3-29) was removed by the author.

4 Cue navigation

The vocalist and the live electronics musician agreed on having the vocalist execute (Intro-C0) at the beginning of a performance as a verification of the correct function of the entire setup. In the performance discussed here, the cues number zero at the beginning of every subsequent movements were executed by the live electronics musician. These cues are not indicated in the score explicitly.

When jumping to a different movement during rehearsals, it is advisable to execute cue number zero of that movement before any other cues in order to set global settings for each movement such as reverb levels etc.

In some cases during rehearsals, jumping between cues within a movement can produce uneven fades, pannings etc. at a later point.

Not all sounding actions of the patch are necessarily stopped by the respective “stop_all” and “stop_rt” messages.

4.1 Other comments

The objects employing direct-to-disk (dtd) recording and playback seem to be obsolete in the version of the patch discussed here.

The author did not succeed to have the attack detection in cues (M2-C1) to (M2-C6) count the correct number of musical events in the voice part. Switching the attack detection on by executing the respective cue did already execute the first detection.

The author found some cues to produce a different spatialization than described in the score (see comments about differences between score and patch above) and assumes that the *spat~* object taking care of some of the spatialization in addition to discrete channel pannings might have been introduced in later versions of the patch after the premiere.

The left channel of soundfile F025 was denoised.

A high-pass filter was applied to soundfile F072 in order to reduce low frequency rumble.

Soundfile F053 currently has an audible and perhaps unintended click at 16 seconds.

In the performances discussed here the last cue's long reverb tail was gently faded out manually by the electronics musician following the conductor's timing.

Cues (M1-C3) to (M1-C6) have their actions combined inside (M1-C2) and are hence executed as empty cues. Cue (M2-C17) repeats the fade-out already present in (M2-C16) and can be considered as an empty cue as well.

The short real-time delays in movement 5 were not very well audible in the performances. This is partly because the ensemble plays a fortissimo part at the same time. The respective cues might have had benefited also from an even higher volume setting, which was difficult to pre-set given very short sound check times with vocalist and ensemble being present.

Editing the volume of individual cues during setup, soundcheck and rehearsals can be considered the essential and time-consuming task when preparing a performance. There are often multiple ways of doing this in each cue's sub-patch, for example by editing the volume of the sample playback messages or by changing the matrix gain factors. The latter have been found to produce a more traceable effect by the author.

5 Acknowledgments

The author is indebted to Frédéric Voisin for his enduring support with regard to questions arising during the preparation of these performances, to Alexis Baskind for kindly sharing his expertise with the piece, to Donatienne Michel-Dansac and Pierre-André Valade, to the musicians of Norbotten NEO and their sound engineer Oscar Lovnér and producer Marita Henningsdotter-Lovnér, to Cyril Béros at IRCAM, and of course most notably to Philippe Leroux for writing this amazing piece of music.