GruntCount – Flute Edition

st316.13.20

sumtone

:

martin parker

gruntCount flute edition

for flute and computer

martin parker

gruntCount flute edition

for flute and computer

martin parker
gruntCount flute edition
for flute and computer

st316.13.20

sumtone
Neckarhalde 38
D-72070 T¨
ubingen
Germany
info@sumtone.com
www.sumtone.com

GruntCount version 1.0 - Flute edition

Martin Parker

October 11, 2011

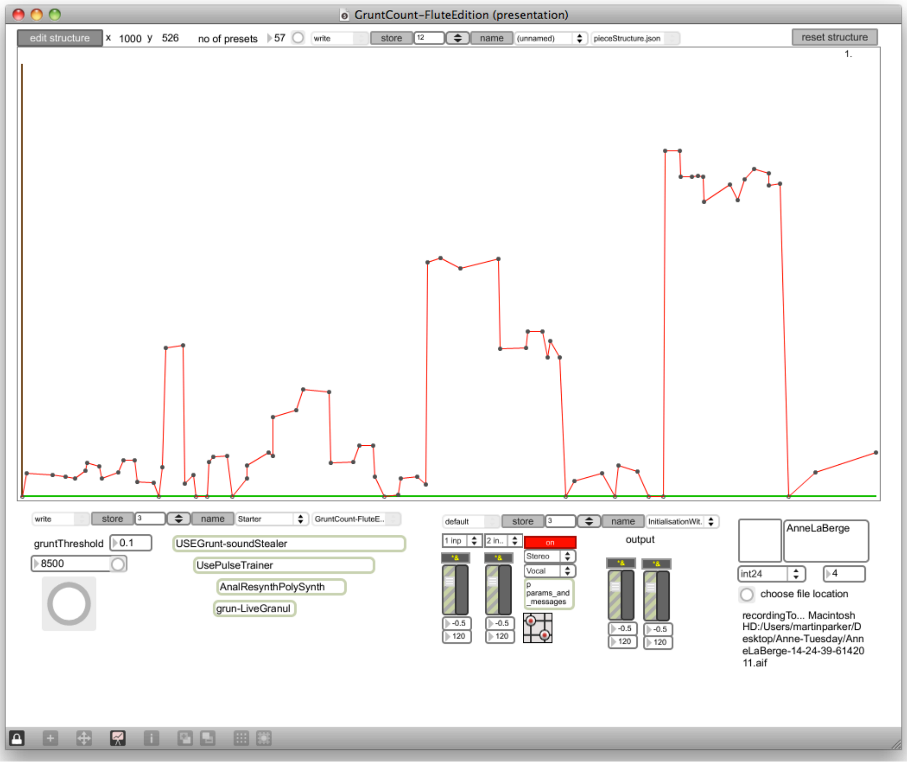


Figure 1: GruntCount - plan of the piece developed with and performed by Anne La Berge in June 2011

1 Introduction

GruntCount is an improvised piece for computer and solo instrument. This is the flute version, it was developed in close collaboration with Anne La Berge at the University of Edinburgh in June 2011[1].

Whilst *GruntCount* is deliberately described as an improvisation, it is also to some extent a repeatable and rehears-able piece of music. Notation instructions have been replaced by a pre-defined structure that is learned as the player rehearses. However, the duration of the piece and the sounds the instrumentalist will play are largely open and this version could be configured to last anywhere between 5 and 20 minutes depending upon the needs of the performance. Such extremes are possible (and permissible), because this is part of the fundamental concept of the piece. Not only should this piece of computer music be accessible and reliable enough for players to be able to rehearse alone[2], the player also gets autonomy to change the scope and scale of the piece by changing the number of ”grunts” to count before the piece finishes. A player who has rehearsed the piece several times will develop an understanding of how the improvisatory tension develops and will give the player confidence to find musical solutions to some of the unexpected events the computer may throw up as the piece runs.

The computer responds to the player by being pushed through a map of interleaved presets with each sound (or grunt) the player makes, no sophisticated score following algorithms are used. The computer part responds to the live input if sound input crosses a threshold specified in advance. Close integration between player and electronics is achieved by connecting the threshold crossing event with a range of interconnected parameter changes that are nested within one another. Unless the settings are configured to remain the same when the threshold is crossed, any sonic event will result in a change across multiple parameters leading to a discernible sonic result. The responsiveness of such a system offers the player chance to respond back. To add to the excitement, a few parameter changes are not absolute, rather a change may simply offer permission for a meso-sonic sound element to be randomised.

GruntCount was designed so that the computer plays its part unassisted. The computer will ideally be present on stage and the player will start the piece off who then must leave the computer alone until the preset map is complete. The computer will dutifully stop making sound once the journey through the preset map is complete. Because there is no score, there are no limits as to how much input is enough to push the piece along and this leaves enough of a certainty vacuum to justify its status as an improvisation.

[1] Anne La Berge first performed the work on 14th June 2011, lecture room A, Alison House, 12 Nicolson Square, Edinburgh, University of Edinburgh. For more information about Anne La Berge, please visit http://www.annelaberge.nl/

[2] without the composer twitching somewhere in the background

1.1 About the flute edition

This version of *GruntCount* and the development of the piece in general owes a lot to three days spent in the company of extraordinary improvising flautist Anne La Berge in June 2011. Anne's contribution to the work as it stands was invaluable. She immediately understood what I was trying to do and patiently fed incredible sounds into the system whilst I stored the settings that we liked the sound of.

Research for this version of the piece was funded by the University of Edinburgh, School of Arts Culture and Environment research fund.

1.2 About the title

GruntCount's title refers to several ideas, I explain them below in no particular order of importance.

1.2.1 At the time of writing...

...war is everywhere. Grunt is a colloquial term used in computer games (such as Microsoft's *Halo*) and in the American military to identify expendable infantry. Whilst writing this piece, there has been an almost weekly increase in the number of young men and women killed across various fronts around the world. The opportunity to express outrage, sympathy or disgust at this is available to any player who wishes to project this onto the piece.

1.2.2 In the toastmaster's association (of Australia)

A grunt counter listens for the ums and ahs said in conversation and notes when a word is unnecessarily repeated. At the end of a toastmaster's competition, the grunt counter will present a report of the number of grunts issued by competing speakers. More information is here http://boroondara.toastmasters.org.au/home.htm

1.2.3 Technically

The piece, almost literally, counts grunts in order to work; the player specifies the number of sounds the computer should count and as it counts, the player pushes their way through a nested array of presets.

1.2.4 Aesthetically

Whilst each edition of this piece is developed with particular players and should be able accommodate their own particular taste and interest as improvisers, the title may be a useful guide for the way to play and what is expected. One might imagine something of a fight or tussle with the computer, that sounds made by the player might bear grunt-like qualities at times[3]. Rather like the off-beats described below, *GruntCount* fills the space in between the sounds generated by instrumental input.

1.2.5 Grunting is what I used to do to count off-beats

As a beginner horn player, my teacher would often comment on one of my bad musical habits; grunts I would make to keep myself in time during sections of music requiring off-beats.

2 Description of the system

2.1 System requirements

GruntCount was developed on a macintosh computer running OS X 10.6 between January and June 2011. The software was written in the MaxMSP programming environment available from http://www.cycling74.com and the standalone version presented here was compiled with version 5.1.7.

GruntCount needs a fast Macintosh computer to work smoothly. It has been tested on Core2 Duo machines with 4GB ram. Excepting the MacBook Air models, any system made by Apple since mid-2009 should be adequate, provided there is enough RAM available.

A windows version does not exist but could be made upon request.

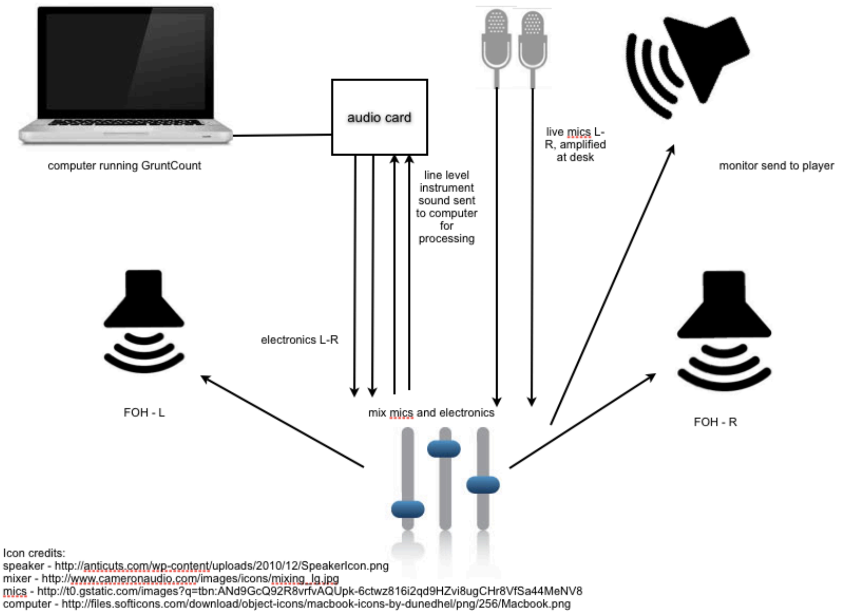
The current edition is stereo, there is no reason why a multichannel version could not be prepared but one of the aims of the piece is to make it easy for concert venues to put the piece on and for players to rehearse anywhere they have access to electricity. The piece can be rehearsed adequately with the on-board microphone and a pair of headphones.

Whilst the main principles of the live electronics processing would not require MaxMSP in order to realise the piece in the future, any rewriting of the software for another system would require a reasonably sophisticated nested preset system, the likes of which currently appears to be unique to MaxMSP, although DMX controlled lighting desks use a similar approach.

[3] Note, the piece is not called HumCount, SingCount, or LaughCount.

2.2 The sound system used for amplification and reinforcement

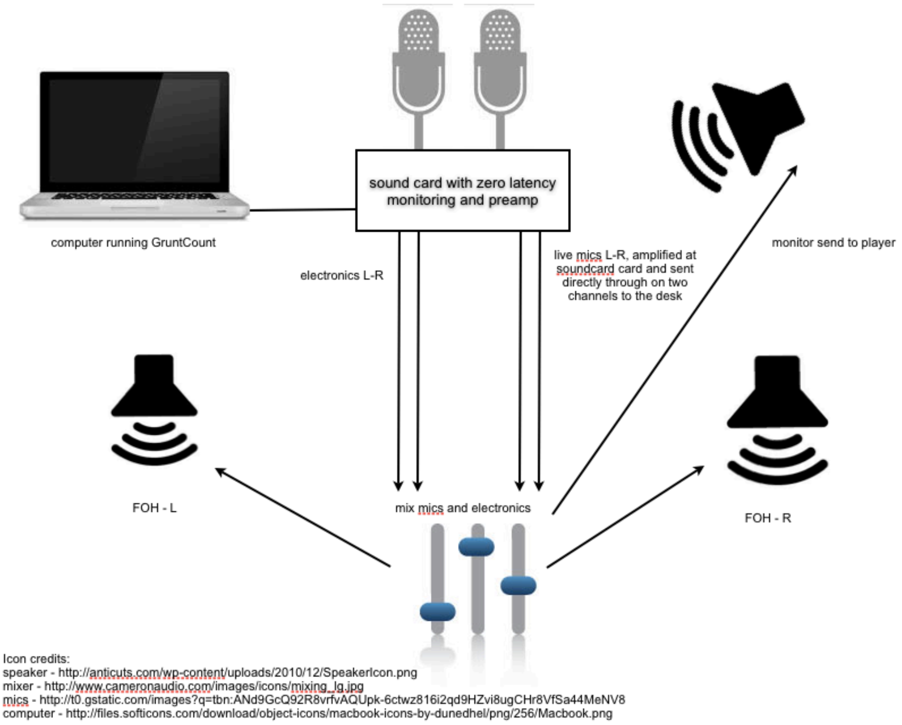
In performance, the instrument should be amplified with two microphones and the live sound reinforced to a level that matches the average level of the live electronics. A few minutes listening to the piece in rehearsal should be enough for a live sound engineer to establish a reasonable level between the two sound sources.


computer running GruntCount
audio card
line level instrument sound sent to computer for processing
live mics L-R, amplified at desk
monitor send to player
electronics L-R
FOH - L
mix mics and electronics
FOH - R

Icon credits:
speaker - http://anticuts.com/wp-content/uploads/2010/12/SpeakerIcon.png
mixer - http://www.cameronaudio.com/images/icons/mixing_lg.jpg
mics - http://t0.gstatic.com/images?q=tbn:ANd9GcQ92R8vrfvAQUpk-6ctwz816i2qd9HZvi8ugCHr8VfSa44MeNV8
computer - http://files.softicons.com/download/object-icons/macbook-icons-by-dunedhel/png/256/Macbook.png

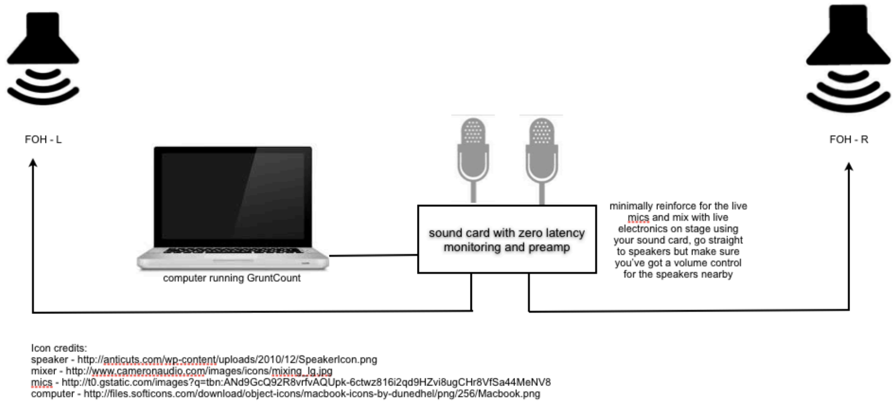
Figure 2: The conventional FoH setup

Alternative setups also work well;


sound card with zero latency monitoring and preamp
computer running GruntCount
monitor send to player
electronics L-R
live mics L-R, amplified at soundcard card and sent directly through on two channels to the desk
FOH - L
mix mics and electronics
FOH - R

Icon credits:
speaker - http://anticuts.com/wp-content/uploads/2010/12/SpeakerIcon.png
mixer - http://www.cameronaudio.com/images/icons/mixing_lg.jpg
mics - http://t0.gstatic.com/images?q=tbn:ANd9GcQ92R8vrfvAQUpk-6ctwz816i2qd9HZvi8ugCHr8VfSa44MeNV8
computer - http://files.softicons.com/download/object-icons/macbook-icons-by-dunedhel/png/256/Macbook.png

Figure 3: Use your sound card to amplify the instrument microphones

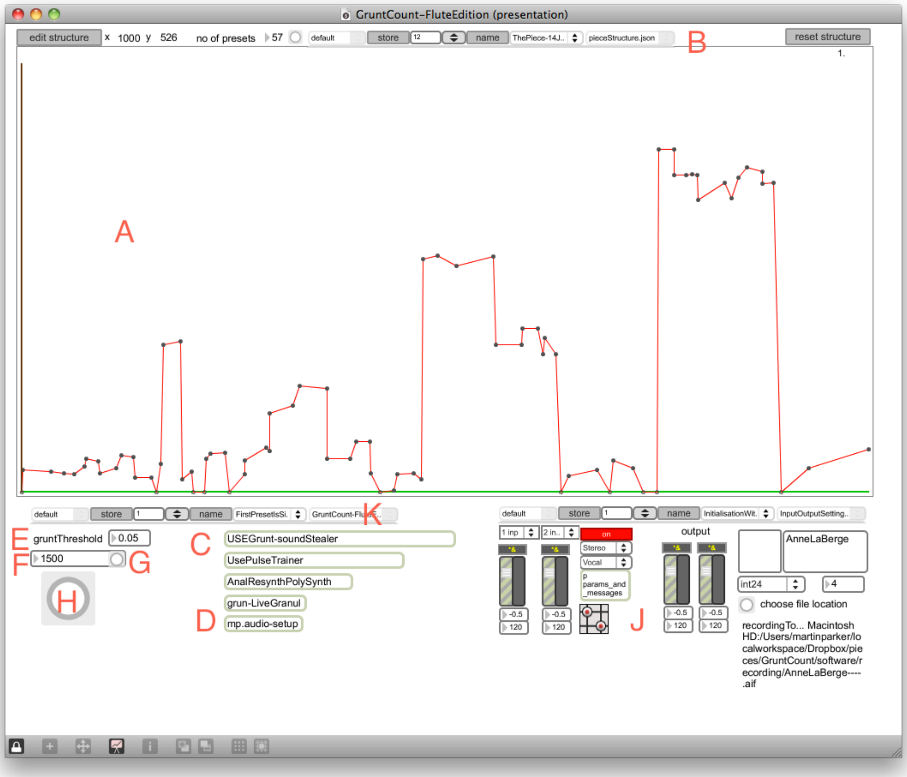

FOH - L
FOH - R
computer running GruntCount
sound card with zero latency monitoring and preamp
minimally reinforce for the live mics and mix with live electronics on stage using your sound card, go straight to speakers but make sure you've got a volume control for the speakers nearby

Icon credits:
speaker - http://anticuts.com/wp-content/uploads/2010/12/SpeakerIcon.png
mixer - http://www.cameronaudio.com/images/icons/mixing_lg.jpg
mics - http://t0.gstatic.com/images?q=tbn:ANd9GcQ92R8vrfvAQUpk-6ctwz816i2qd9HZvi8ugCHr8VfSa44MeNV8
computer - http://files.softicons.com/download/object-icons/macbook-icons-by-dunedhel/png/256/Macbook.png

Figure 4: Make the player part of the live electronics and mix very little live sound into the speakers. In a setup like this the speakers can be closer to the player with the electronics and live instrument treated as acoustic elements in the space. Keep a volume knob handy during rehearsals at least so that the player can control the level of the speakers.

2.3 Overview

- A - Map of the piece
- B - Choose and store different maps of the piece
- C - The four live processing voices



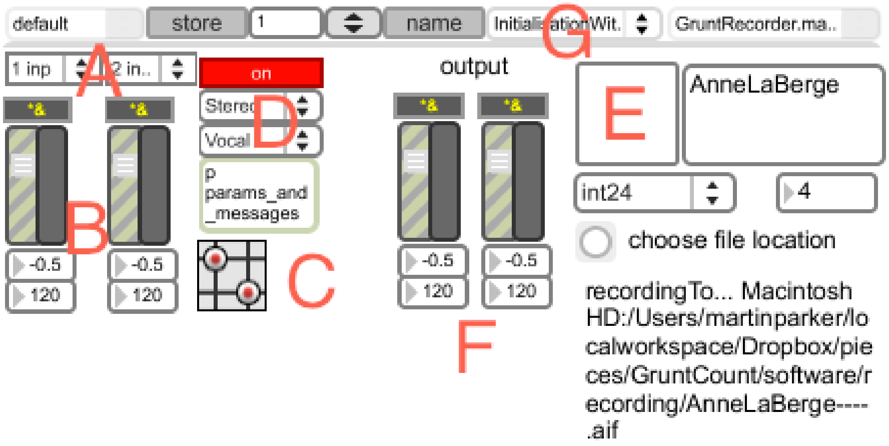
recordingTo... Macintosh HD:/Users/martinparker/localworkspace/Dropbox/pieces/GruntCount/software/recording/AnneLaBerge----.aif

Figure 5: *GruntCount* overview

- D - Setup your sound card
- E - Set a threshold for detecting a ”grunt”
- F - How many grunts to count? 10000 generally leads to quite a long piece (10 minutes) if you play a lot.
- G - Click this to arm the software ready to start playing the peice
- H - Reset everything (start again)
- J - Sound input, output and recording module
- K - The most important part, storing the master presets (mixes between different voices), storing presets here have compositional impact so store and name them wisely

2.4 Sound input and output module

The software currently expects two channels of audio input and two of output. Whilst the piece will work perfectly well with one input, it is best to use two signals as most instruments sound better when picked up from two positions. This is also good practice if you’re doing any sound reinforcement.

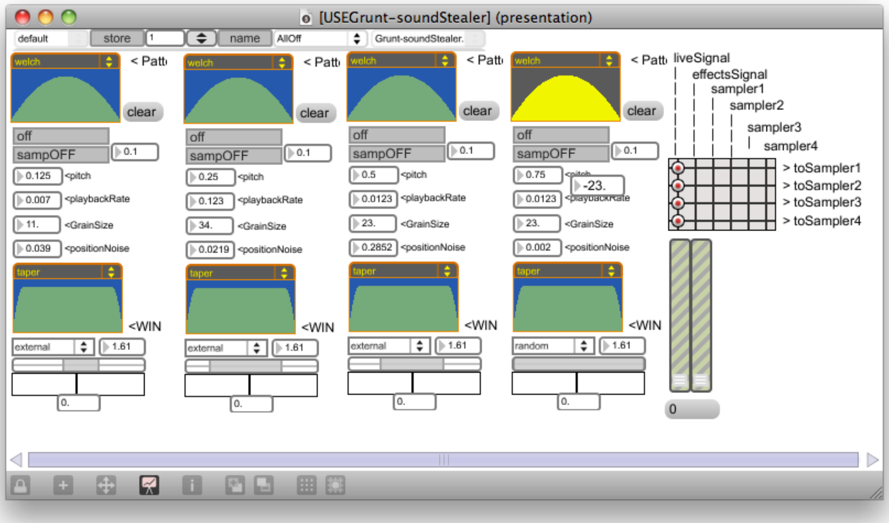


recordingTo... Macintosh HD:/Users/martinparker/localworkspace/Dropbox/pieces/GruntCount/software/recording/AnneLaBerge----.aif

Figure 6: Set a level for sound input and enable the compressor. When you're happy with sound input and output, store the settings and you'll have them saved for your performance

- A - choose which channels of audio input on your audio card are to go into the software
- B - Set a level for the input
- C - Route mic inputs to software inputs
- D - Enable the compressor and set it to stereo (if you're using two channels of input)
- E - Set a record location and the number of channels to record as 4, give a file name prefix (in the image, the prefix is AnneLaBerge)
- F - Set output levels, 127 or 0 is unity
- G - Store the settings as a preset and name it (rehersal settings, concert venue X settings, whatever, then you can recall these at another time)

2.5 The four voices



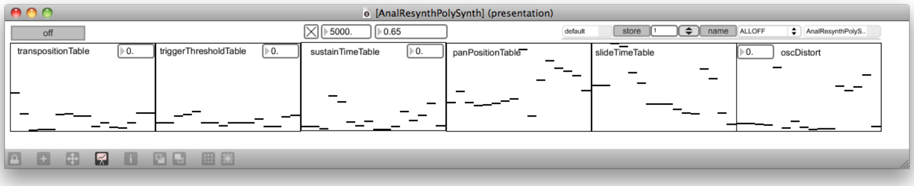
0.1
0.125 <pitch
0.007 <playbackRate
11. <GrainSize
0.039 <positionNoise
external 1.61
0.

0.1
0.25 <pitch
0.123 <playbackRate
34. <GrainSize
0.0219 <positionNoise
external 1.61
0.

0.1
0.5 <pitch
0.0123 <playbackRate
23. <GrainSize
0.2852 <positionNoise
external 1.61
0.

0.1
0.75 <pitch
-23.
0.0123 <playbackRate
23. <GrainSize
0.002 <positionNoise
random 1.61
0.

Figure 7: Threshold-triggered auto sampler with feedback (self sampling), and audible windowing



☒ 5000. 0.65
transpositionTable 0.
triggerThresholdTable 0.
sustainTimeTable 0.
panPositionTable
slideTimeTable
0. oscDistort

Figure 8: Analysis and resynthesis. This voice takes live sound input and discerns 16 spectral components (pitches) to resynthesise. It generates a haze around the input.

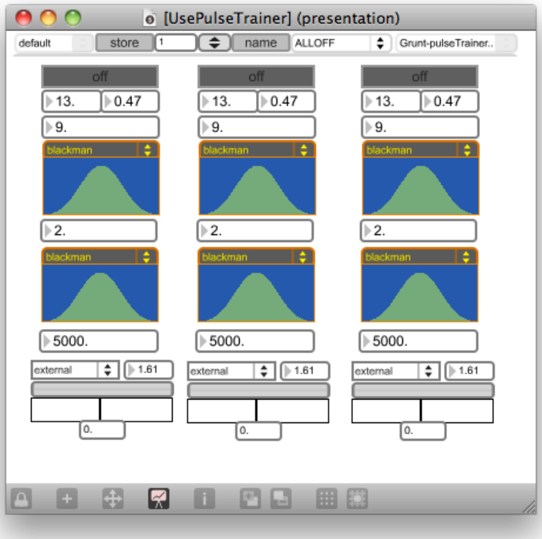
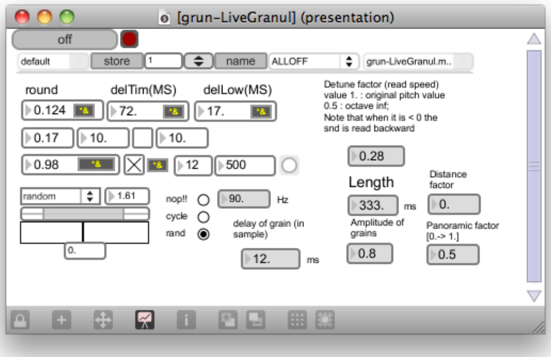


Figure 9: Pulse trainer, this voice synthesises pitch tracked rhythmic bass elements from the live input



Detune factor (read speed)
value 1. : original pitch value
0.5 : octave inf;
Note that when it is < 0 the
snd is read backward

Figure 10: Pitch shifting and rhythmical delay. This voice performs live pitch shifting on the voice using granulation techniques, and also has the option to produce a rhythmical delay based on whether or not a threshold is crossed. It changes delay time dynamically and without clicks or the gliding pitch sometimes associated with moving delay lines.

2.6 Presets

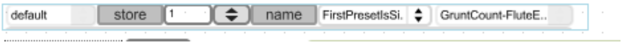


Figure 11: Preset Manager

3 Creating a new edition

To make an edition for another instrument requires somewhere between 3 and 6 hours of studio time with the composer. Anne La Berge and I worked in the following way to setup the current edition and the following paragraphs describe a methodology that has been used to generate other editions of the piece.

First, each voice (described in section 2.5), was soloed and Anne excited the voice with improvised live input, she could hear the results on loudspeakers in the room. As she played, I stored presets for that voice, giving the presets names that Anne and I might remember and described the kind of input that worked.

Once a map of presets for each voice had been setup (around 20, or so settings per voice), master presets for combinations and mixes of these voices were established by storing presets in the master preset unit (see K in 5). We made around 60 presets that we liked.

At this point, we had to stop making presets and start thinking about a way they might fit together. This is the most compositional element involved in creating an edition because this is where you draw the map of the piece you want to ultimately rehearse and perform. See figure 5 for the map of the piece we designed for the first performance.

Once your settings are saved (and backed up somewhere), it is possible to design multiple maps with the presets you've designed. The maps can be constructed for different venues, durations, concert types and numbers of grunts you want to count.

The *Grunt Threshold* and number of grunts that get counted have a significant effect on the way the piece will behave so it is well worth experimenting with these settings at length.

4 Rehearsal

Setting the threshold over 1. allows you to manually move the playhead to a point in the piece and practice some material for those settings. Lowering the threshold from that point allows you to continue playing through the piece and experience interpolation between presets.

It is possible to reset the map of the piece itself to a series of discrete steps, this way you can practice each step of the preset map individually. Anne La Berge has told me that she did her daily warmups with different presets so she could learn the different responses of the settings.

5 Recording

The software is designed to allow you to record four channels straight to hard disk, without needing to rely on an engineer. Specify a location to record to and start the record button when you start the piece. The application automatically stops recording when you quit the application so you don't need to worry about leaving files with bad headers on your hard drive.

Mixing of the four channels into something for distribution should be done by a skilled mixing engineer, or the composer.

6 Versions

The current version of the software is active and maintained. The standalone application works as expected on Macintosh OS X machines. Bugs should be reported to Martin Parker.

Upgrade roadmap

- Starting and stopping the patch
  1. Make simpler start
  2. space bar arms the system and makes it ready to play
  3. ability to check that max audio is on and signals are coming in before the piece is armed / on
  4. udio ON/OFF, soundcard choice, on main display
- Patch aesthetics
  1. Easier access to the DAC
  2. Colour of the edit structure button should be red when enabled
  3. Make the windows smaller for the objects when opening them.
- Playhead -Control over the play head so you can rehearse different sections to be made easier
- Mixing -Create a mixer for the individual voices of the patch so that there can be more dynamics / shading between voices
- SoundQuality
  1. Good quality reverb and ability to mix blend of reverb at different points in the piece, but preference is to find something tasteful that matches the room.
  2. Choice of impulse responses. Can't be changed in the piece but blend / presence can be.

3. Dynamic EQ on each voice
4. Ability to drop in a VST to polish everything up nicely.

- Recording
  1. Set a sensible file path automatically
  2. Show recording time
  3. If file gets too large, stop recording for a second and start again
  4. Mixer to choose which inputs / outputs get recorded where.
  5. Ability to record multiple mics and pre or post reverb / effects.

Wish list

- Paths to settings files clear and easy in standalone
- Different numbers of GruntCounts across the piece, some sections travel faster than others
- Multichannel Version - ability to choose whether you are multichannel or not within the same software, or everything exactly the same only you have a multichannel standalone but with exactly the same preset tree.
- Randomised Journey through presets for free imrpov version with no piece shape but a sensitive listener / reactor that can go anywhere.

7 Code credits

GruntCount was compiled with version 5.1.7 of the sound programming software MaxMSP http://www.cycling74.com.

The current version of *GruntCount* relies on the following 3rd party externals.

- *sigmund* is a pitch tracking external developed by Miller Puckette, ported to MaxMSP by Millter Puckette, Cort Lippe and Ted Apel. It is downloadable from here; http://crca.ucsd.edu/~tapel/software.html, accessed 4th October 2011. This external provides the basis for the analysis and resynthesis section of the *GruntCount* engine.
- *livegranul* is an external taken from GMU's library for advanced granulation. *GruntCount* uses this to It can be downloaded from here; http://www.gmem.org/index.php?option=com_content&view=article&id=317&Itemid=250, accessed 4th October 2011.
- Alex Harker's excellent set of scaling externals have been used for remapping and scaling numbers into the signal domain. They can be downloaded from here; http://www.alexanderjharker.co.uk/Software.html, accessed 4th October 2011.

- *vb.phasor0* is an extremely useful external by Volker Boehm (2007). It only passes changes to the speed of a phasor ramp when the ramp cycle is at 0. It is handy way of avoiding clicks when playing back audio samples at different rates. It is currently available here; http://www.esbasel.ch/Downloads/MaxMSP-Objects.htm, accessed 4th October 2011.
- I borrowed code from Zack Poff's multiscreener application; http://www.zachpoff.com/software/multiscreener/ in order to determine the path location of the standalone application. This is essential for finding and loading the relevant preset files when the application starts.

8 Rights

GruntCount is the intellectual property of Martin Parker. The settings and piece structures discussed above were developed with Anne La Berge so this edition is the product of both of our work.

8.1 performing

Permission to perform the piece can be arranged with the publisher www.sumtone.com for a small charge. Sumtone will make the software available to you and put you in touch with the composer should you need help setting the system up initially. Software, settings files for the flute edition, and manual are accessible via the Sumtone site http://www.sumtone.com/catalogue-composer.php?id=13.

8.2 recording

GruntCount has a built-in four channel file recorder. When performing, it is requested that recordings of the performance are made and passed onto the composer if possible. The file recorder can be useful for sending recordings of your performance to the composer and concert promoters but the four channels do require mixing first. Please don't put recordings up online or send to other people without permission from the composer.

8.3 software distribution

Please don't pass the software around to just anybody, it helps the publisher (and to some extent) the composer if the piece is accessed and performed via official channels.