Speck NET

Research Consortium in Speckled Computing

Making Motion Musical

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Body as an Interface

- Towards a more dynamic relationship in Human Machine Interaction, we have to consider the body as our model,
- Investigate its chaotic functions and features.
- Sense, Receive and Analyze data from the physical gestures(3d).
- Design applications thinking in 4d (dynamic, interactive systems have to be designed with “time” as their main axis)

Embodiment and Interactivity

- Embodiment in the context of a dynamic real-time sound generation based on physical human gestures is defined by the interplay between the physical body, the data body and the sound.

- The body becomes both a subject and an object by affecting and being affected by its virtual sound environment (representation) and vice versa.

Sensing Motion

- Through Cameras
- Motion Analysis can be interesting, but it doesn't actually refer to the physiology of the movement but to a weird projection of the movement depending on the angle of the camera, on a 2d plain.

- Through interfaces.
- New generation of sensors and the dramatic increase of their size can provide reliable interfaces for motion analysis and tracking.
- Very expensive wired hardware can be replaced with cheaper, smaller and wireless devices with network capabilities such as Specks provide.

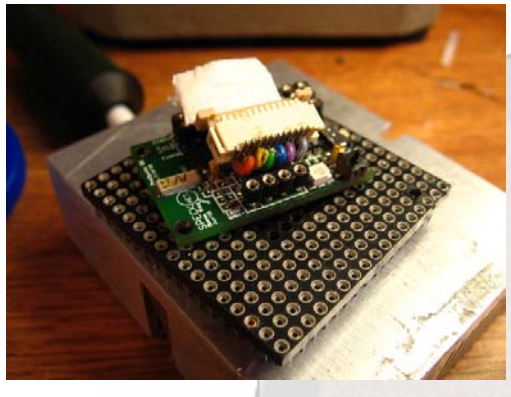
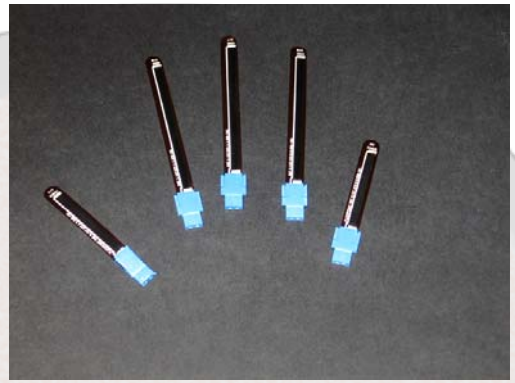
The NeuroGlove

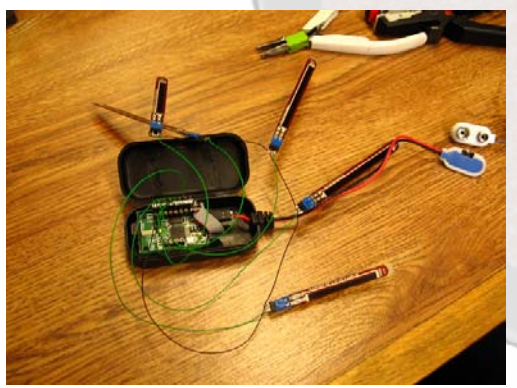
- The NeuroGlove consists of a 5 bend sensors circuit and an Orient2 prototype, developed at Specks Lab, an INU that has 3 Gyroscopic sensors , a 3-axis Accelerometer and a 3-axis Magnetometer.

- The goal was to sonify the data directly from the movements of the performer, creating a relation and building a narrative between Physical and Musical Gestures. As it was successfully mentioned, this was like…

"composing by creating an algorithm in real-time while trying to build a relation with the system".

Hardware Development

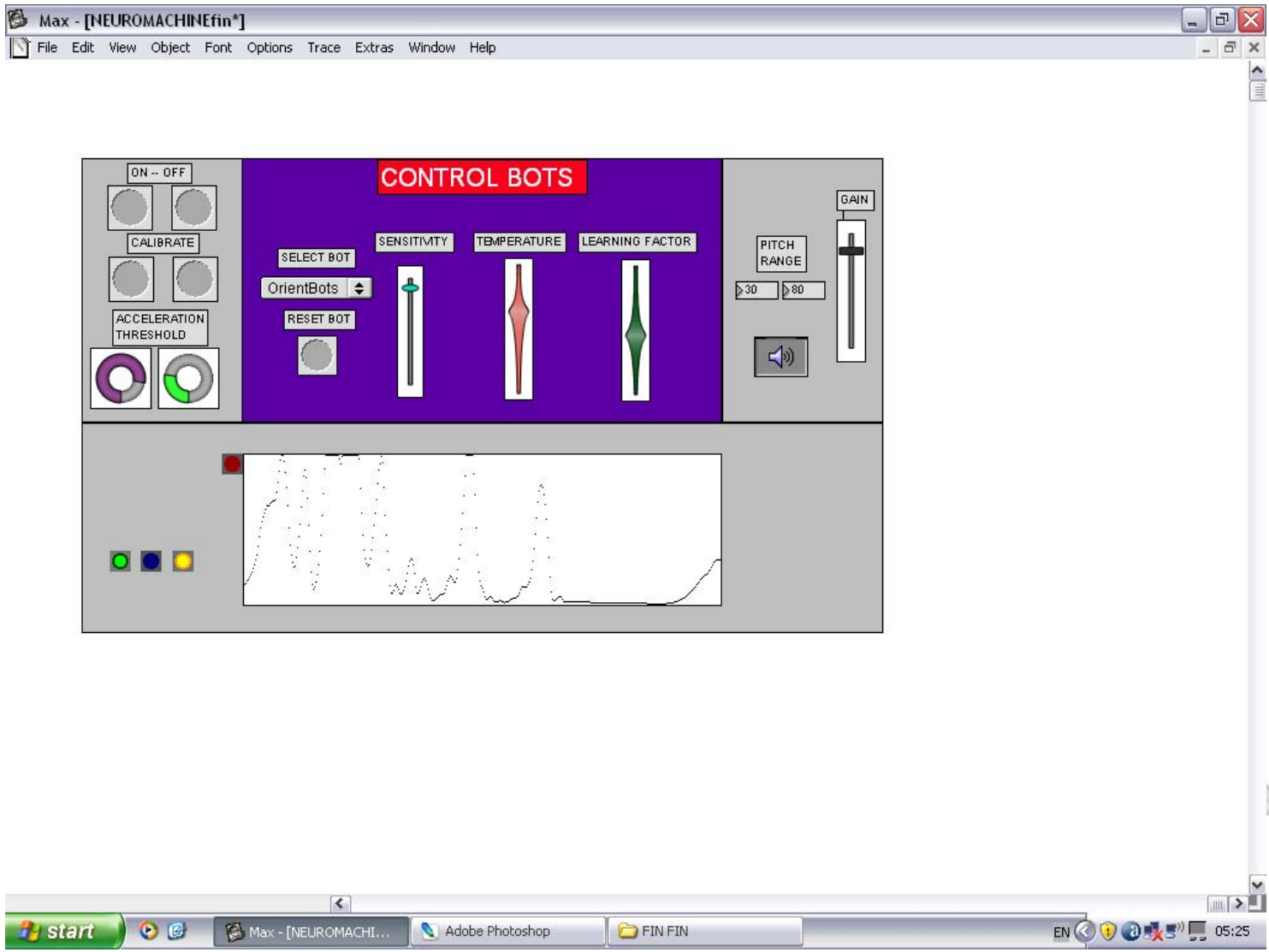





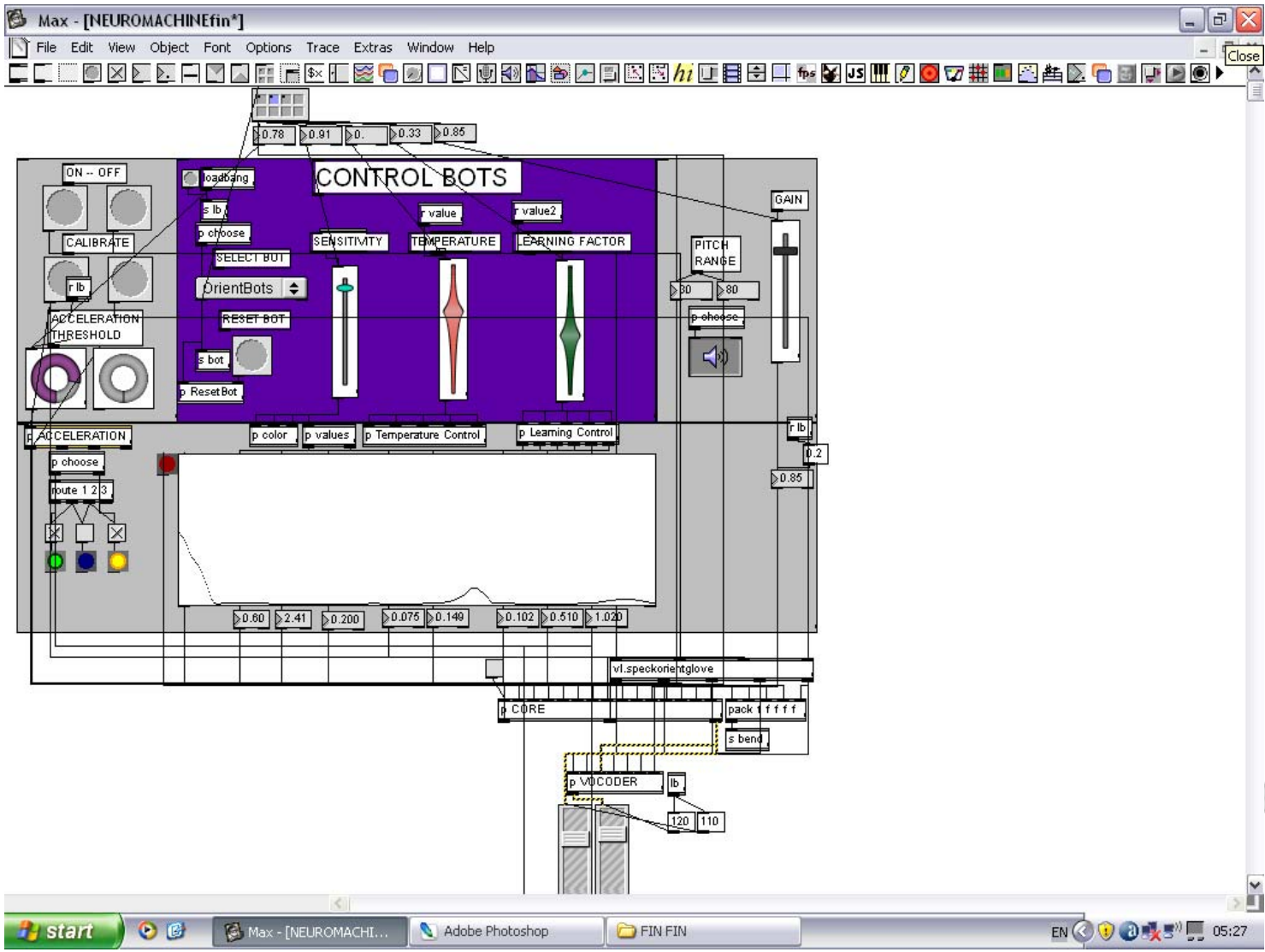

Short Description

- Raw data are getting analyzed by a Neural Network based on Self Organization Maps (Kohonen Algorithm).
- The system has 3 sets of SOM's each one providing a special character, and can be trained separately.
- Error factor provides the fundamental note to the system and sensor data create the harmonics.
- Reverberation of the output creates the sonic field in which the musical events may occur.
- Acceleration, effects the system and changes its parameters

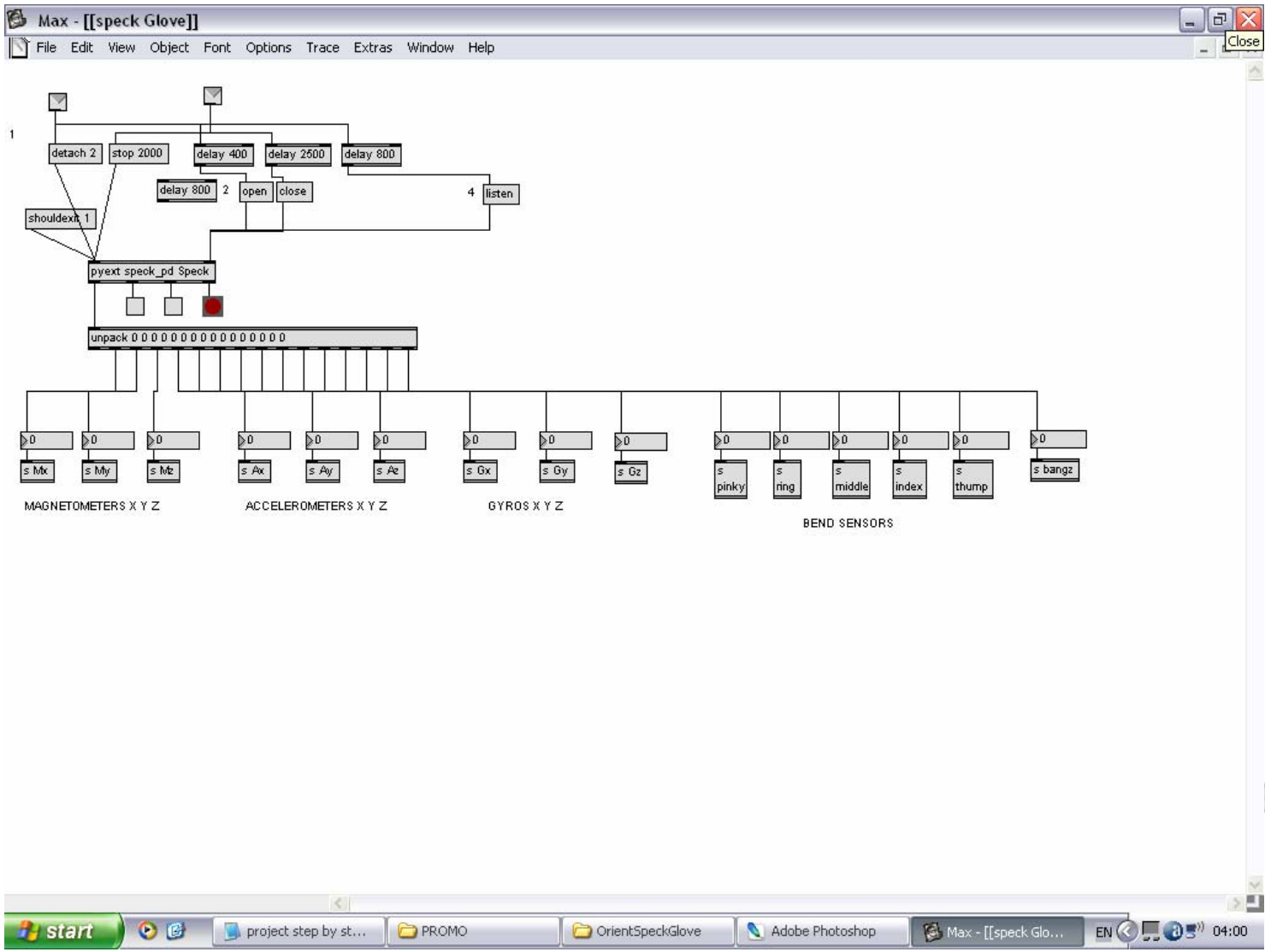
Max in Deapth



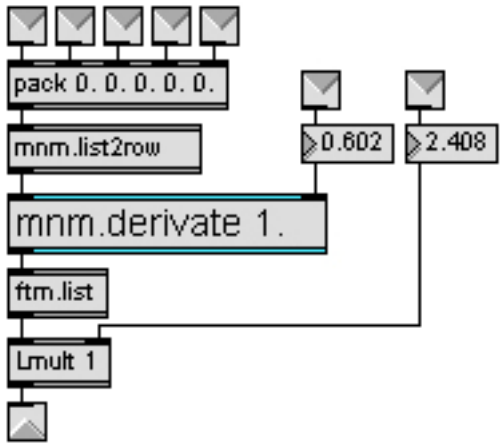
Under the skin



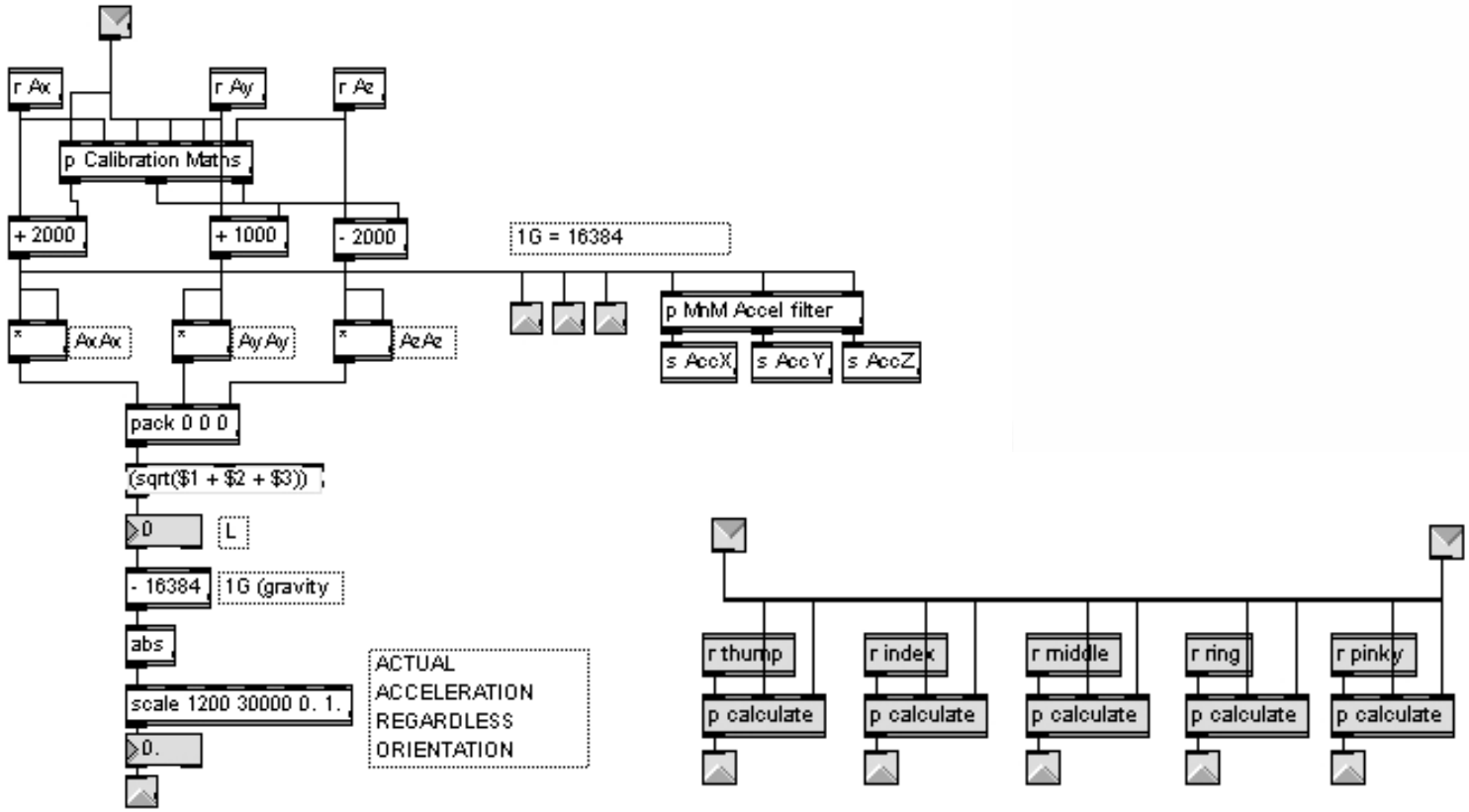
Data receive from Speck



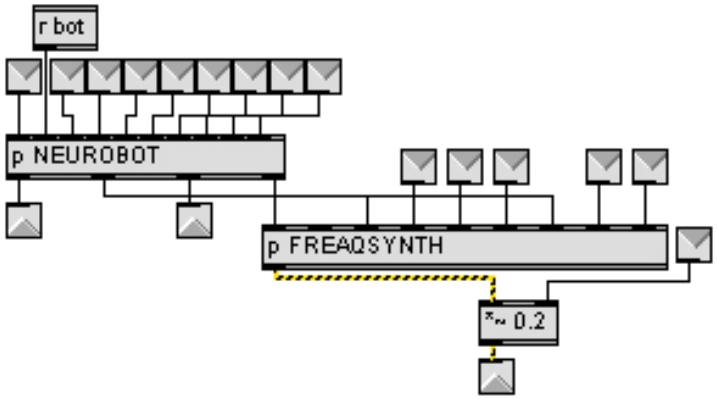
Filter Values with MnM



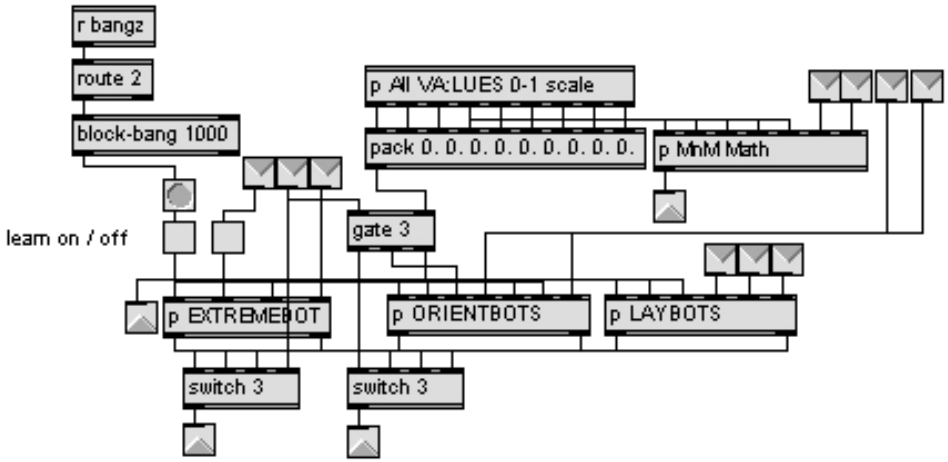
Acceleration and Calibration Maths



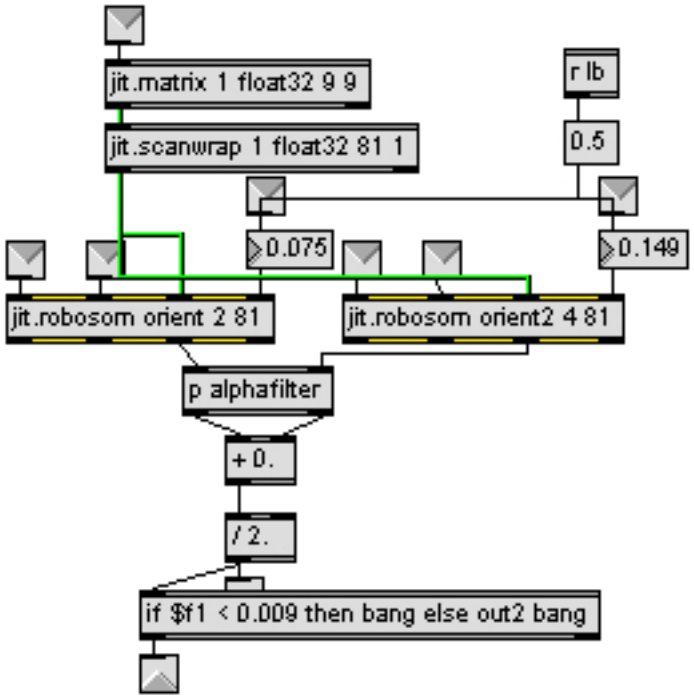
Core



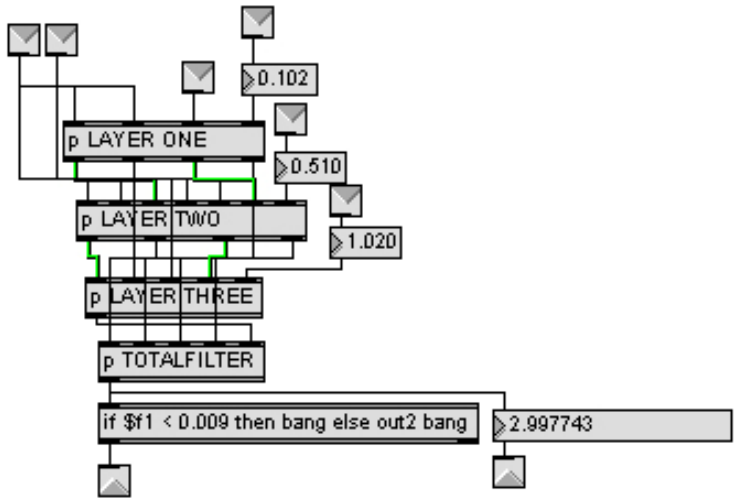
NeuroBots


r bangz
route 2
block-bang 1000
p All VALUES 0-1 scale
pack 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
p MnM Math
learn on / off
gate 3
p EXTREMEBOT
p ORIENTBOTS
p LAYBOTS
switch 3
switch 3

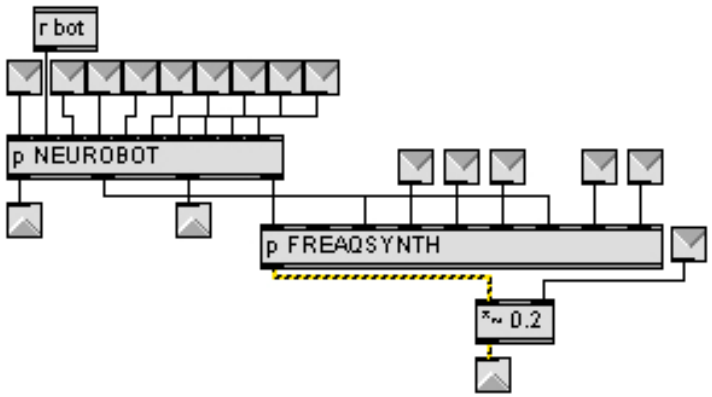
Orient-Bots


jit.matrix 1 float32 9 9
jit.scanwrap 1 float32 81 1
r lb
0.5
0.075
0.149
jit.robosom orient 2 81
jit.robosom orient2 4 81
p alphafilter
+ 0.
/ 2.
if $f1 < 0.009 then bang else out2 bang

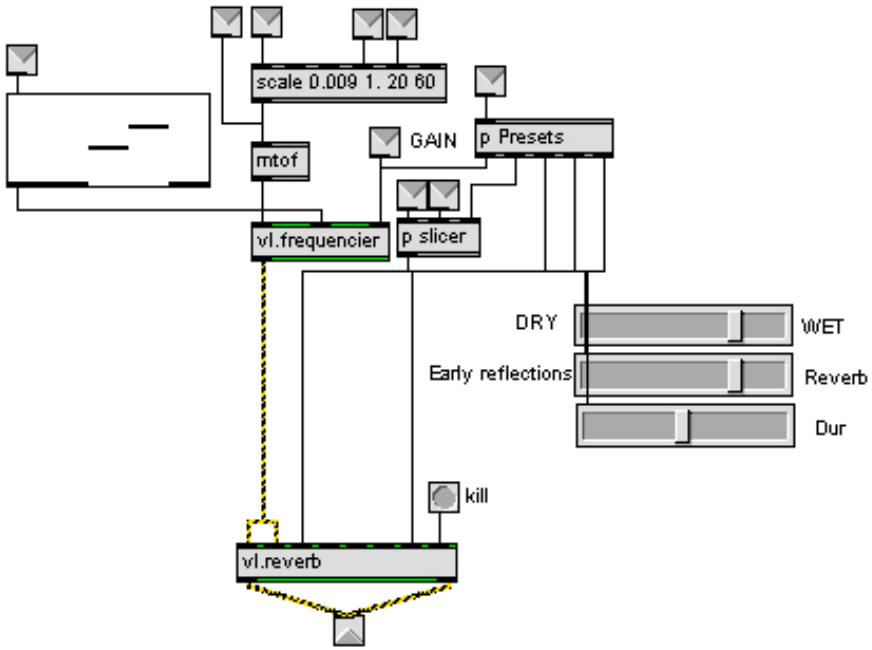
Lay-Bots


0.102
p LAYER ONE
0.510
p LAYER TWO
1.020
p LAYER THREE
p TOTALFILTER
if $f1 < 0.009 then bang else out2 bang
2.997743

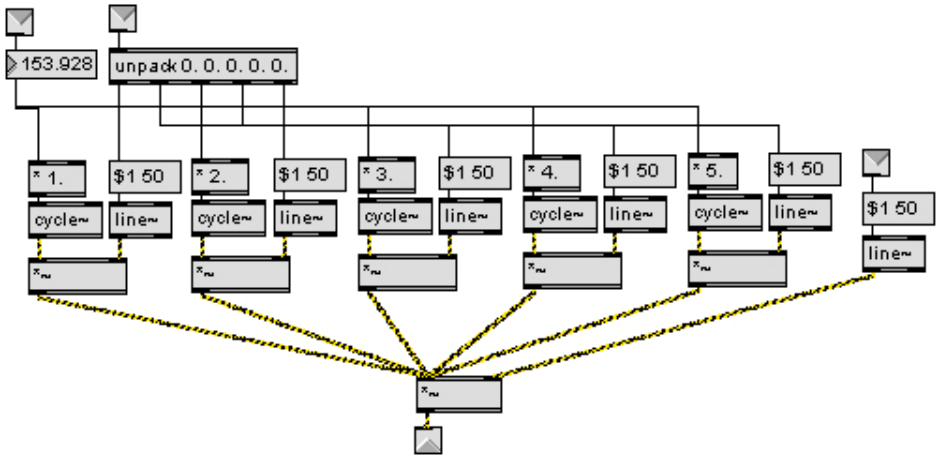
Core



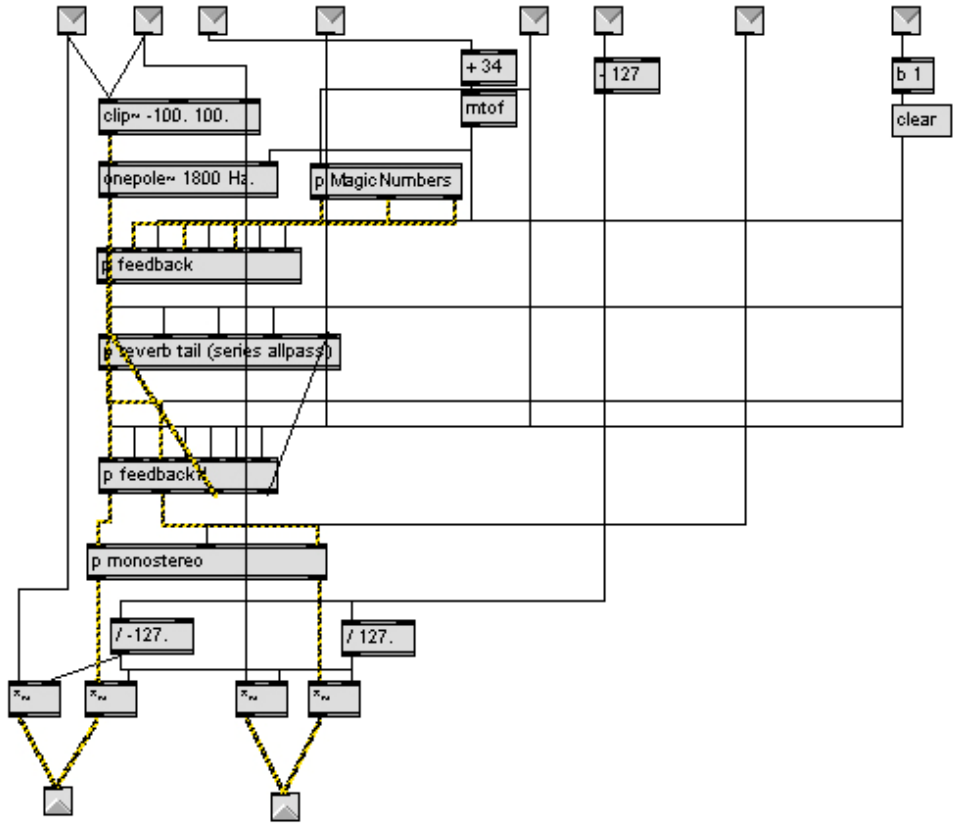
Freq-Synth


scale 0.009 1. 20 60
GAIN
p Presets
mtof
vl.frequencier
p slicer
DRY
WET
Early reflections
Reverb
Dur
kill
vl.reverb

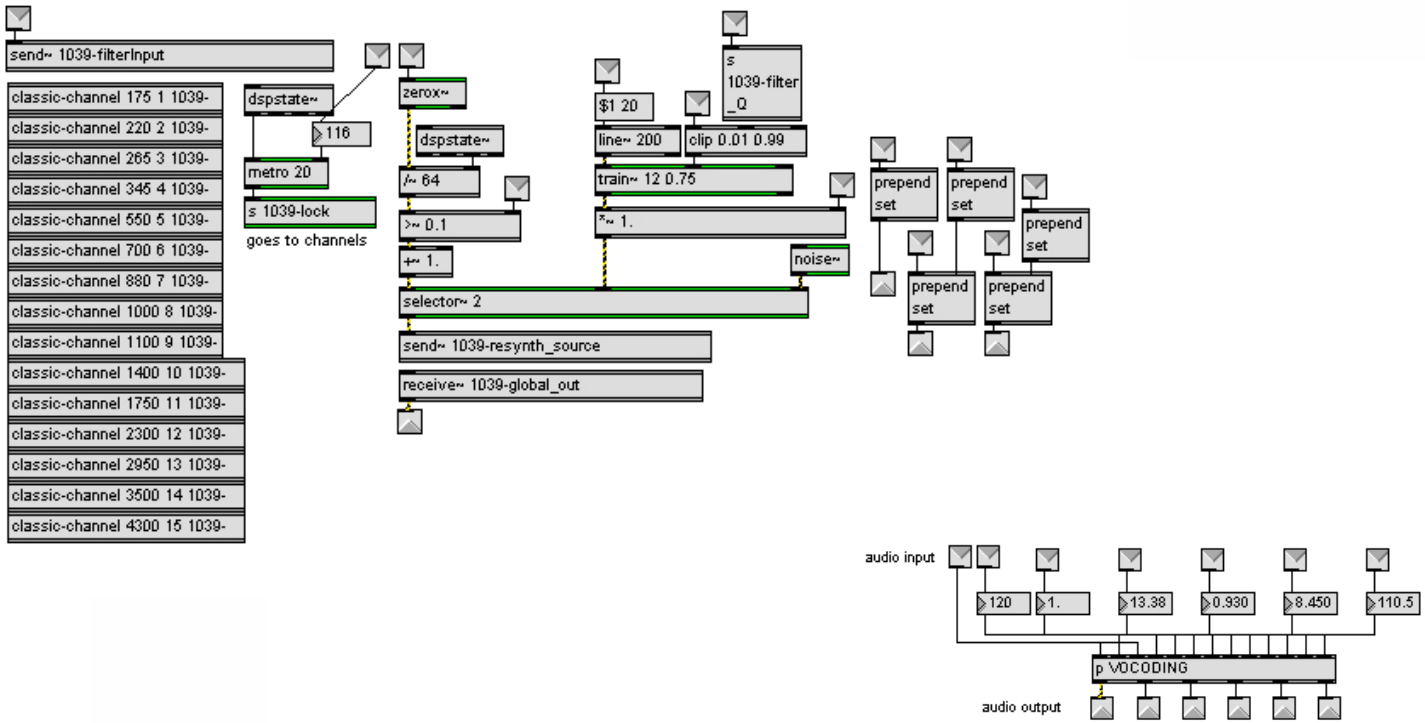
Frequencier



Reverb


+ 34
- 127
b 1
mtof
clear
clip~ -100. 100.
onepole~ 1800 Hz.
p Magic Numbers
p feedback
p reverb tail (series allpass)
p feedback1
p monostereo
/ -127.
/ 127.
*~
*~
*~
*~

Vocoder


send~ 1039-filterInput
classic-channel 175 1 1039-
classic-channel 220 2 1039-
classic-channel 265 3 1039-
classic-channel 345 4 1039-
classic-channel 550 5 1039-
classic-channel 700 6 1039-
classic-channel 880 7 1039-
classic-channel 1000 8 1039-
classic-channel 1100 9 1039-
classic-channel 1400 10 1039-
classic-channel 1750 11 1039-
classic-channel 2300 12 1039-
classic-channel 2950 13 1039-
classic-channel 3500 14 1039-
classic-channel 4300 15 1039-
dspstate~
116
metro 20
s 1039-lock
goes to channels
zerox~
dspstate~
/~ 64
>~ 0.1
+~ 1.
selector~ 2
send~ 1039-resynth_source
receive~ 1039-global_out
$1 20
line~ 200
s 1039-filter_Q
clip 0.01 0.99
train~ 12 0.75
*~ 1.
noise~
prepend set
prepend set
prepend set
prepend set
prepend set
audio input
120
1.
13.38
0.930
8.450
110.5
p VOCODING
audio output

Further development

- Further Development of the project would be to realize the conceptual framework and then develop the additional software for a multi sensor device network that could be attached on to a performers body and provide interesting sonic output in relation to his expressive gestures.

- Vangelis Lympouridis, University of Edinburgh 2006
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