On the use of Myo as an extension for digital musical instruments

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Real-time Interaction Performance eksamen
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Outline

What

- digital musical intruments (DMI)
- real-time control of granular synthesis parameters
- Myo^{TM} as input sensor
- Max/MSP programming environment

Motivation

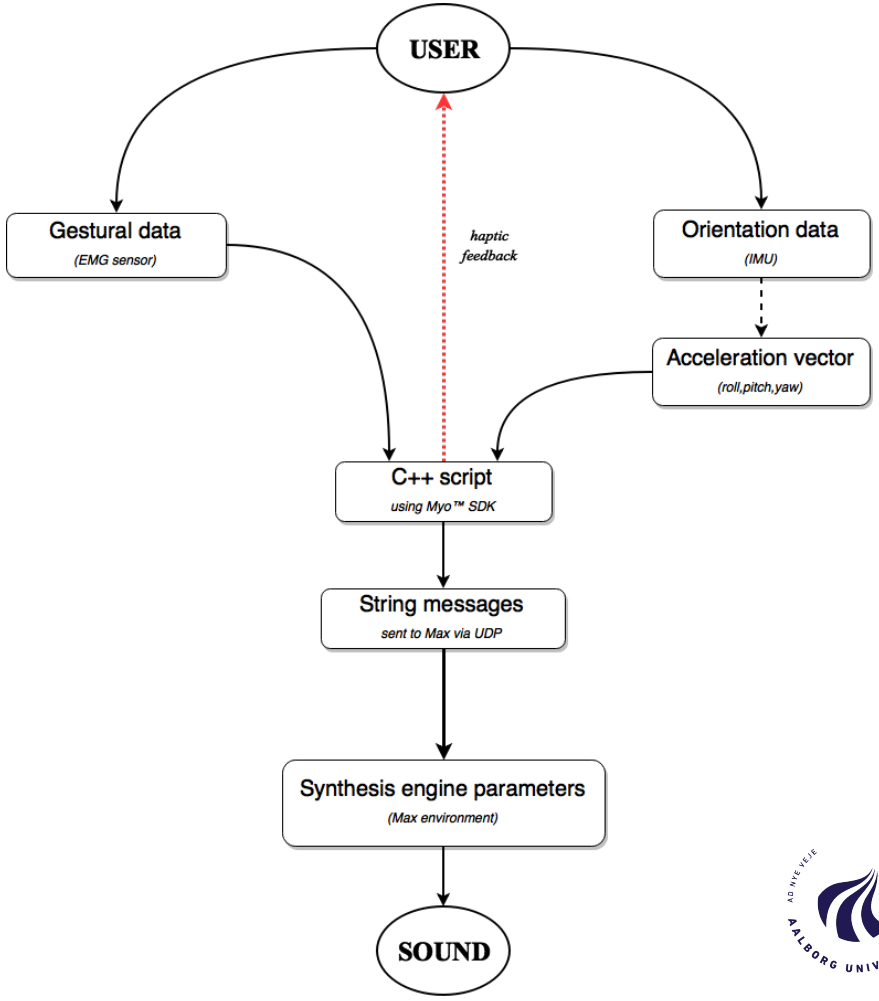
- improve the possibilities of expressiveness when performing using laptops
- provide the musician with some human-feel control gestures

Aims

- close the gap between complex synthesis method and human gestures (Overholt, 2009)
- match between spatial/visual controls and synthesis parameters

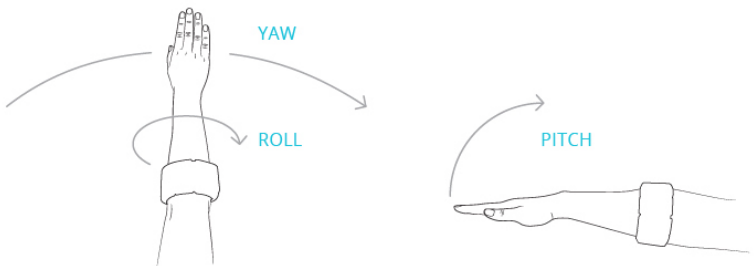
Implementation model

- spatial data from sensors
- data processing inside the C++ script
- specific command to Max/MSP via UDP protocol



Myo gesture control armband

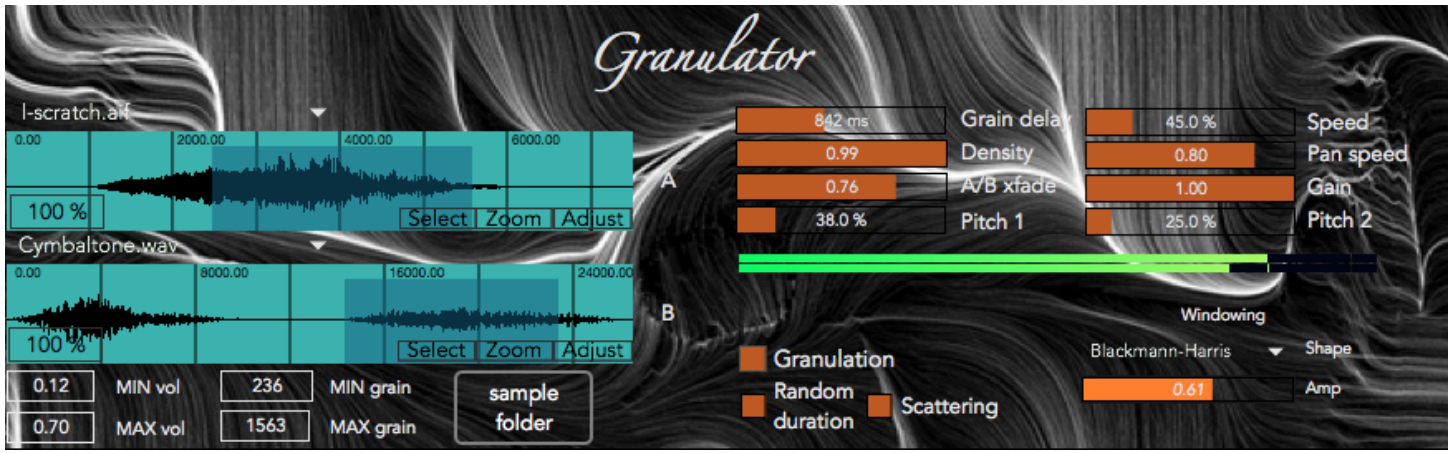
- gestural data (*hand poses*)
- roll, pitch and yaw angles



Granular synthesis in Max/MSP

- *asynchronous* granular synthesis engine
- parallel stream of grains using ∼poly
- specific features (semi-stochastic controls, *scattering* option and two reading buffers)

The user interface



Gesture-to-parameter mapping

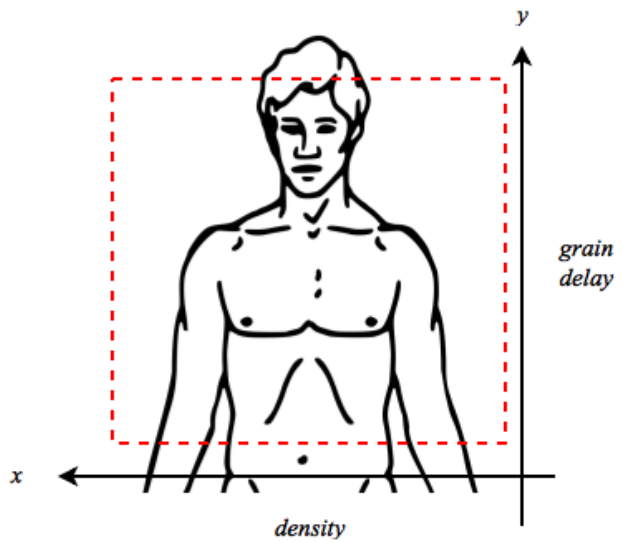
Detected gesture	Sound parameter	Type (Myo data)	Range
Fist	Speed	Continuous (roll)	0/1
Fingerspread	A/B crossfade	Continuous (roll)	0/1
Wave in	Random grain dur	Trigger	-
Wave out	Scattering	Trigger	-
-	Density	Continuous (yaw)	0/1
-	Grain delay	Continuous (pitch)	0/2 (sec)

- *top* level (*always-active*)
- *bottom* level (invoked with gestures)

The parameter space

- integer scaled values
- virtual quadrilateral in front of the user

it is a *focal* space



(the control space is defined by the red dashed square)

Evaluation

The MITDS framework

Overholt (2009)

- new gestural grammar (semiotic gestures)
- the *analog* metaphor
- focus on features to enhance uniqueness
- correspondence between nature of parameters and gesture
- extra-human effort: the *conductor* metaphor

Evaluation

O'Modhrain framework

O'Modhrain (2011)

- system mainly oriented to performers and composers
- possible lack of usability for non-skilled people
- constraints onto the mapping space
- audience feedback is missing

Further improvements

- interpolation when large jumps are detected moving from one pose to another
- allow the user for its own space parameter definition
- granular synthesis on/off when *double-tapping*
- some trigger control has revealed **not** much relevant to the synthesis control

Conclusions

- good *trade-off* between the amount of parameters and the intelligibility of the mapping model
- many advantages might come from the use of Myo^{TM}