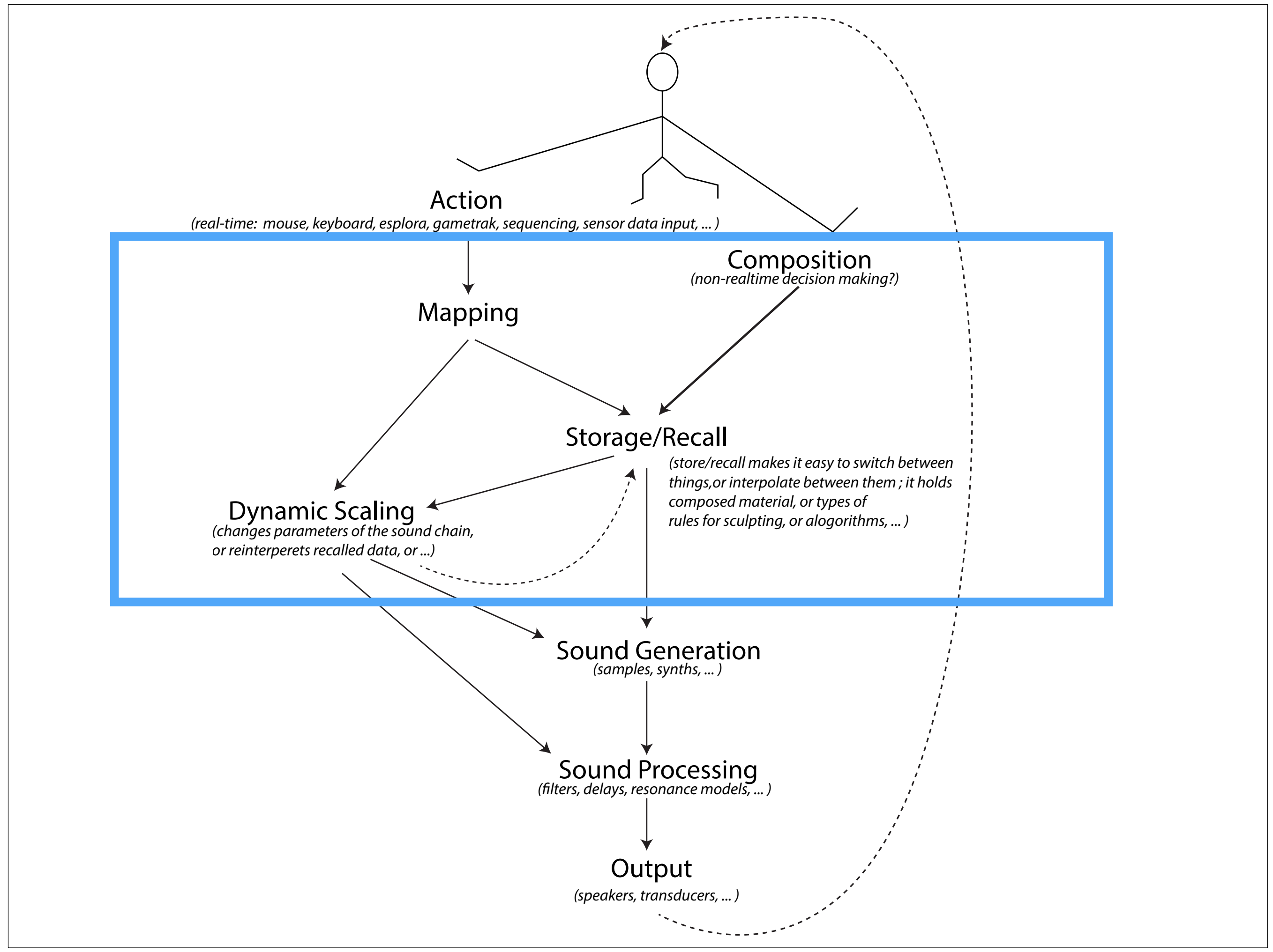
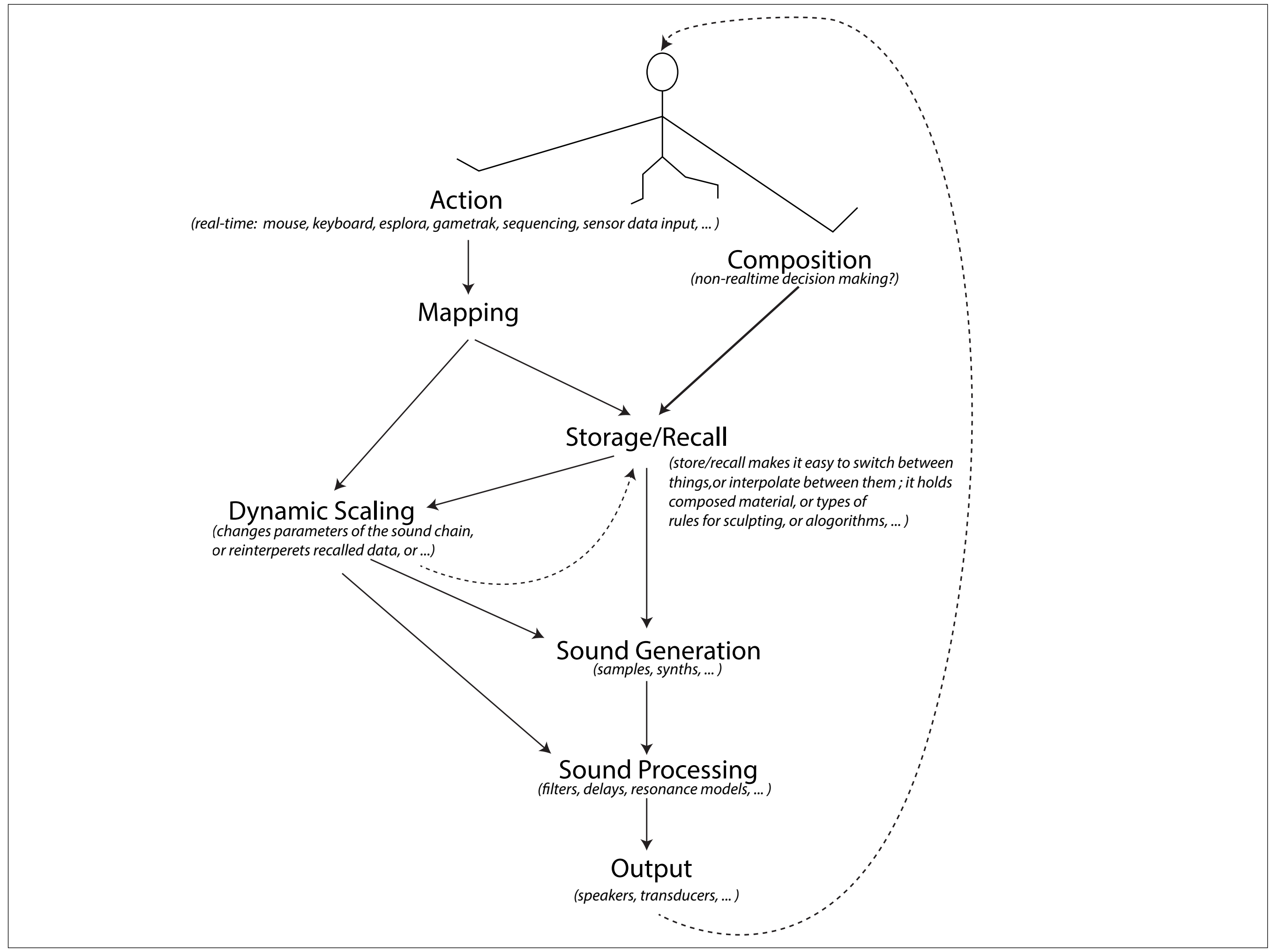
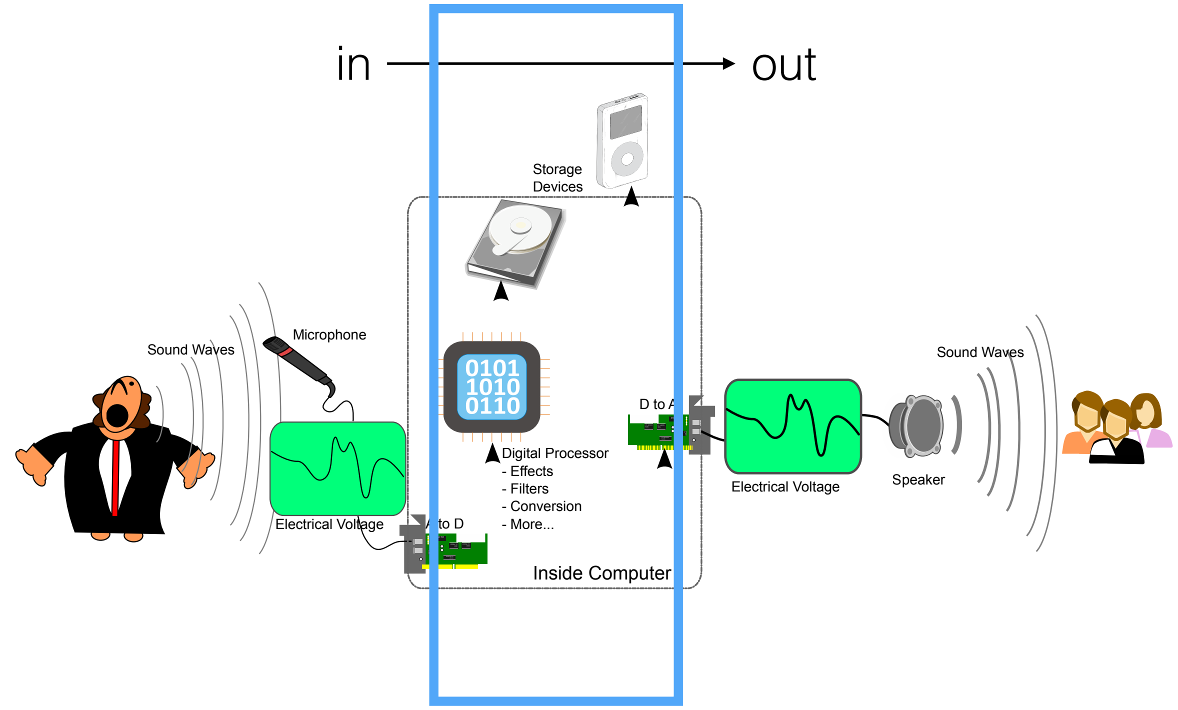
data mediation



today we're going to focus on the data mediation aspect of instrument design



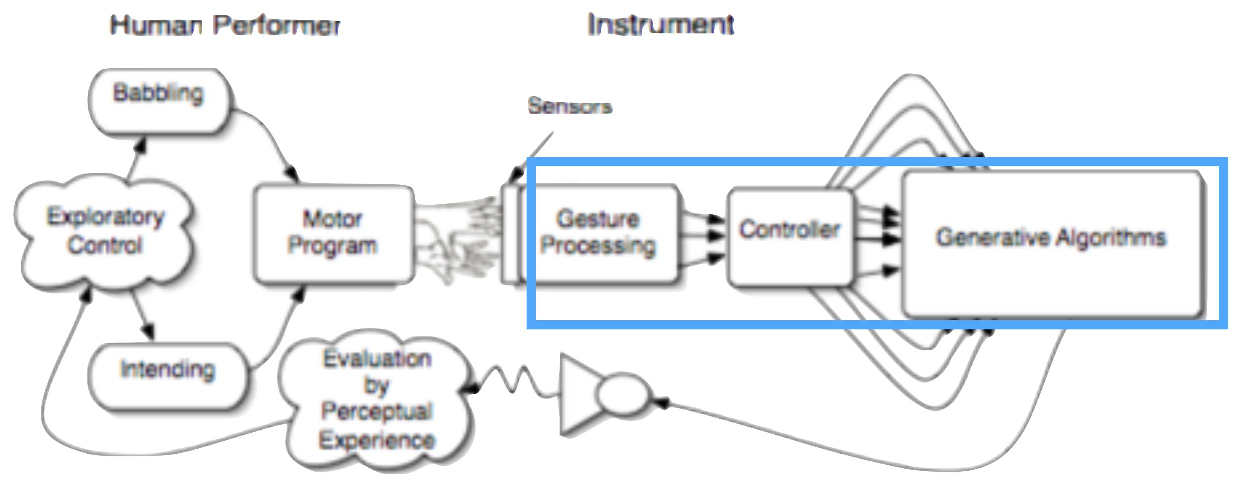
which completes the picture of the system that we're working through



analog to digital to analog

this is the part of the system that really defines the nature of how we experience the results of the inputs

A framework for reasoning about computer-based musical instrumentation



what is data mediation?

what is data mediation?

… let's start with mapping

the mapping we're talking about is the way information is translated from one form to another
in the case of a cartography, the image is meant to represent the location of streets and rivers so that we can know where they are.

$$f(x) = y$$

mapping

mapping can also thought of as a function, that transforms a number from the input to the output.

$$f(x) = y$$

$$cartography(place) = representation$$

mapping

so in the case of the geographic map, we could say that cartography maps the information about a place to a readable visual representation

Andy Hunt , Marcelo Wanderley, and Matthew Paradis:
“The Importance of Parameter Mapping in Electronic Instrument Design”

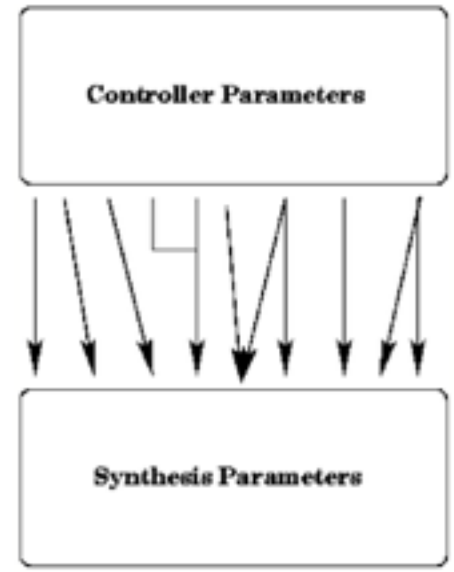


Fig. 1. A generic model of the mapping problem.

mapping

in the case of computer music instrument design, we are talking about how we “map,” or create relationships, between control parameters (i.e. sensor data) and the parameters of our sound engines.

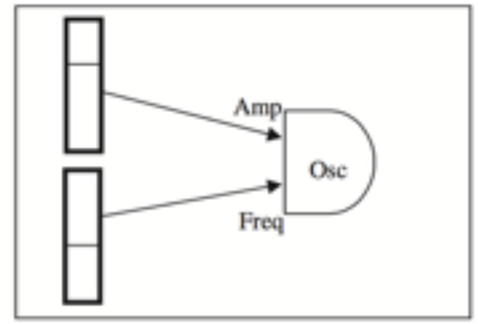
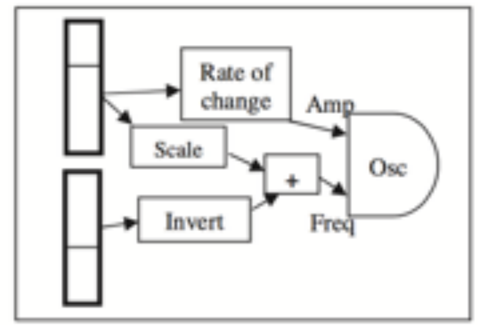


Fig. 2. Simple Mapping for Experiment 1.



mapping

Fig. 3. Complex Mapping for Experiment 2.

examples of direct, one-to-one mapping, and a more complex interrelated mapping space

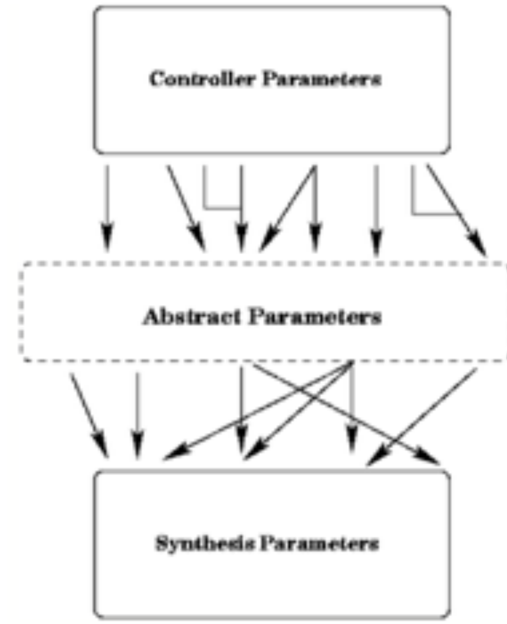
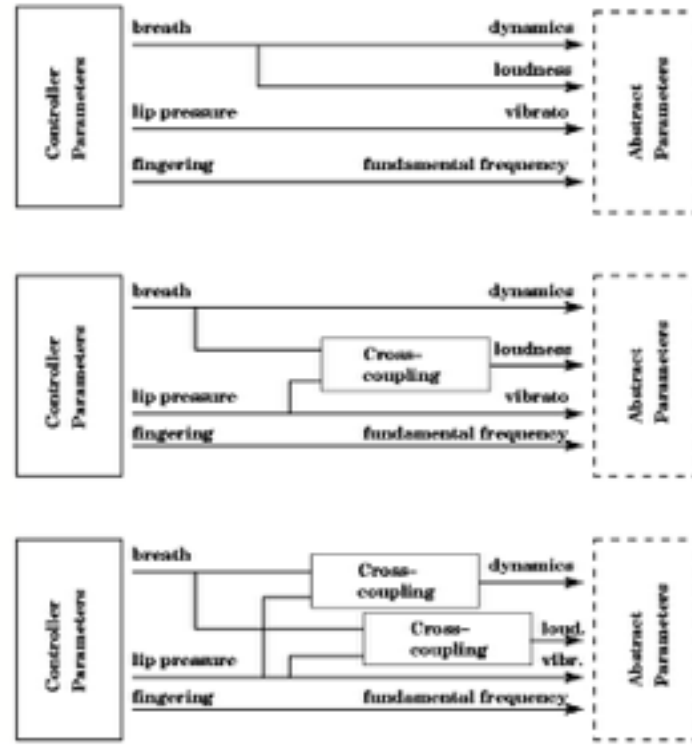


Fig. 11. Two-layer mapping model showing intermediate layer of abstract parameters.

mapping

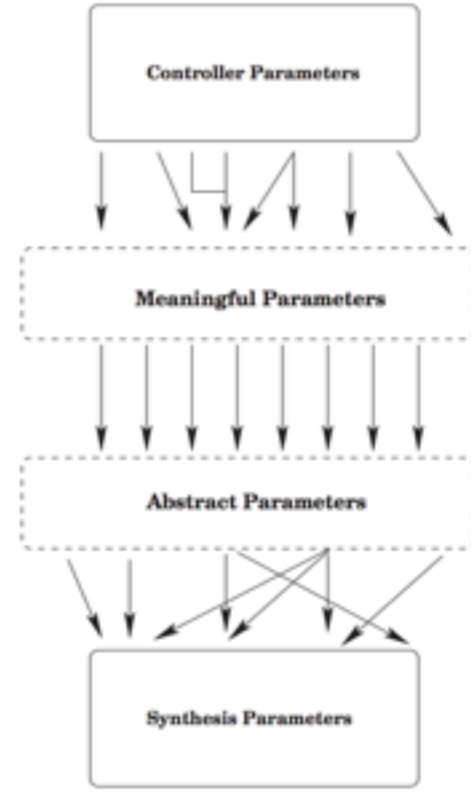
in Wanderly's first layer of abstraction in mapping, you abstract the low-level synthesis parameters, to more abstract musical values, like: pitch, vibrato, tremolo, brightness, etc.

for example, the "feedback" parameter in a delay system is really a scaling of the delay as it is fed back into the delay loop, but the perceptual result is "feedback"



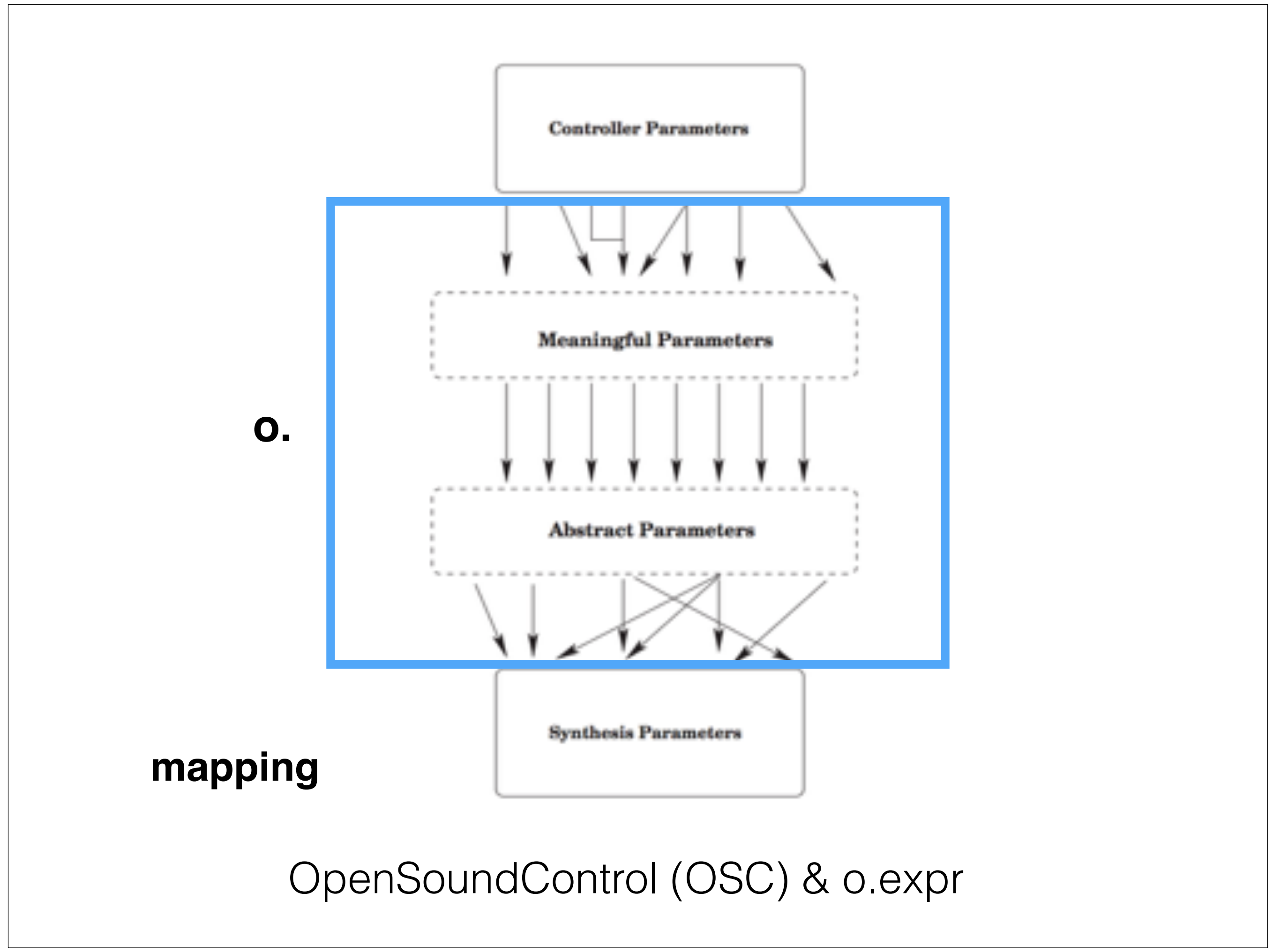
mapping

Fig. 10. The three mappings used in the clarinet simulation presented in Rovan (1997).

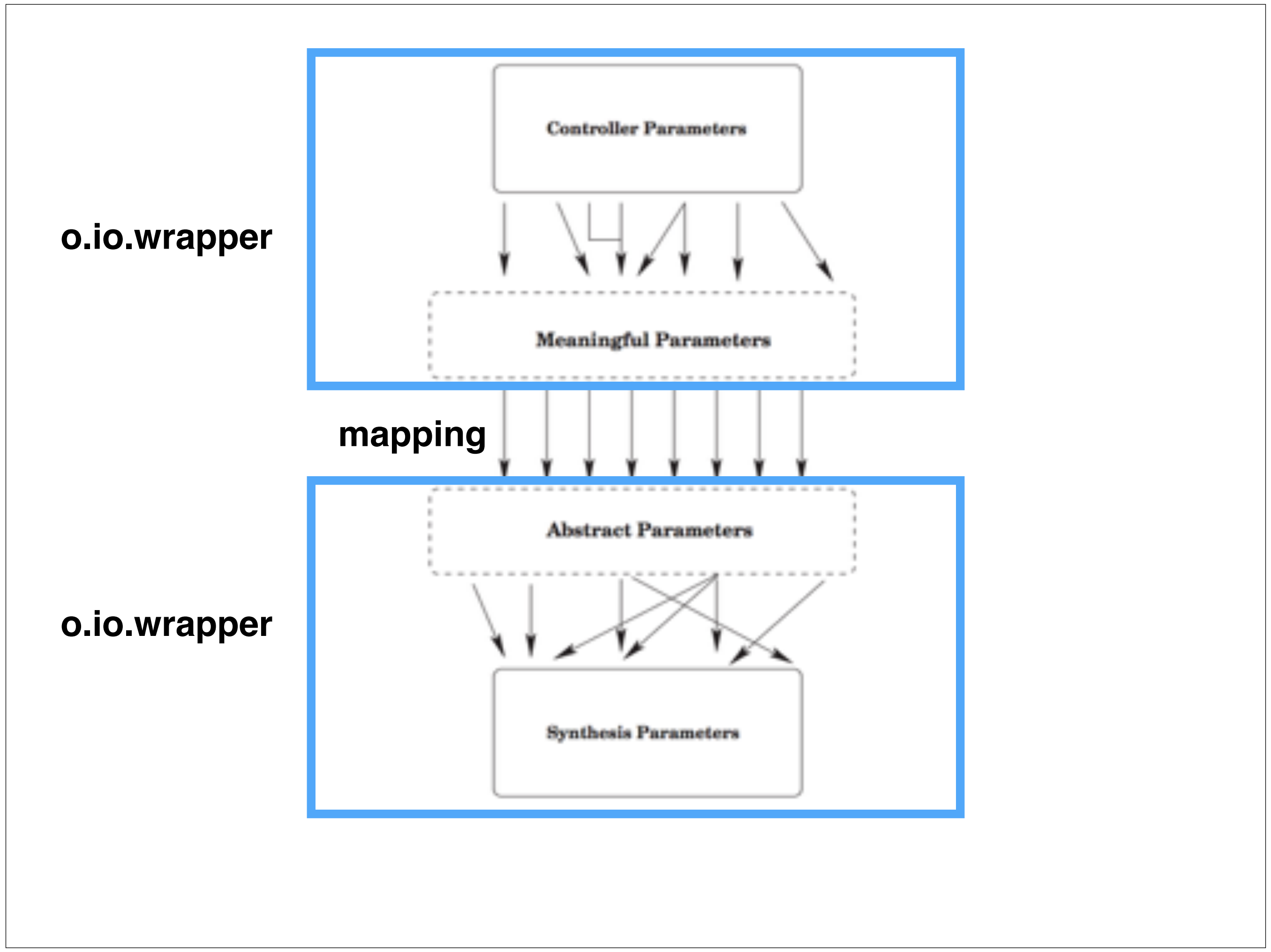


mapping

in a
through mapping we translate control parameters into a meaningful representation, and then use these parameters to control synthesis parameters.



OSC and the odot expression language was created in order to simplify this process, allowing us to think in terms of meaningful parameters, as well as a stateless programming model (more on this later).



o.io.wrappers function to handle translating OSC bundles into individual numbers that the synthesis engine understand.

Alexander Jensenius PhD thesis, Chapter: “Gesture Description Interchange Format”

GDIF input wrapper design

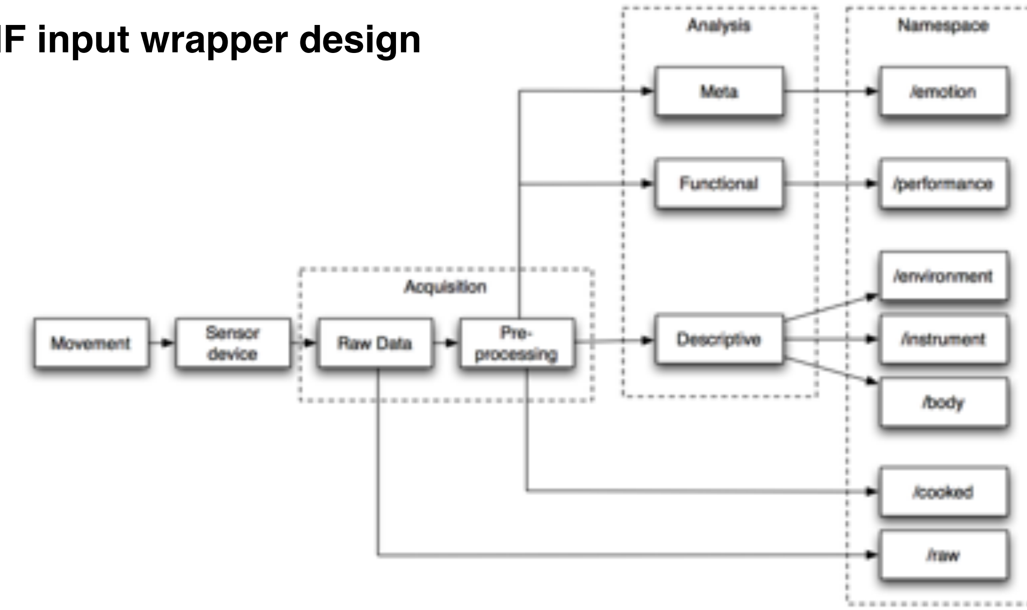
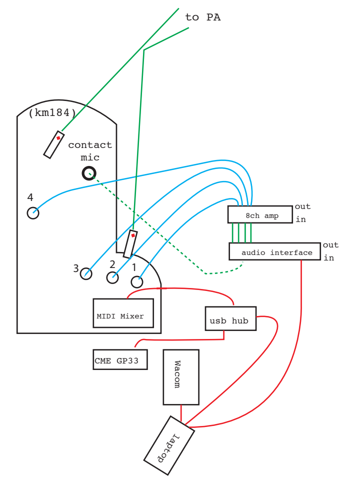


Figure 9.3: *Sketch of the multilayered approach suggested for the GDIF OSC namespace.*

Alexander Jensenius, a former student at CNMAT from Wanderly’s lab at McGill, developed the Gesture Description Interchange Format for his PhD thesis.

This approach is very closely related to the o.io.wrapper, where sensor data is translated into meaningful names, and analysis is applied to gather higher order information, like velocity, relative position, etc.



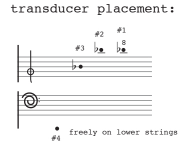
audio cables
speaker cable
MIDI pedal cable (1/4")
computer cables (usb or firewire)

MacBook Pro
Wacom tablet
MIDI mixer (UC-33, BCF2000 or sim)
CME GP33 Foot pedal
USB hub

audio interface (FF800 or sim) with at least 4 outs and 1 input
4ch amplifier

4x small transducers (Dayton Audio)
2x KM184 (or sim)
1x contact mics

transducer placement:



notes on transducers:
- some weights should be used on #2-4 to increase their pressure on the strings.
- #1 should make the top strings ring.
- #2-4 should also act as preparations on the strings, if they do not completely effect
- the string, use an additional preparation so that these pitces are metalic and percussive
- when played with the piano keyboard.

case study:
"spark" wacom-transducer-feedback instrument by rama gottfried