Walking on the MuMe: Interfaces for Design, Performance and Creative MuMe-ing

Ollie Bown, Design Lab, University of Sydney

designlab

oliver.bown@sydney.edu.au @olliebown

mamas

SCHOOL OF INTERACTIVE ARTS + TECHNOLOGY

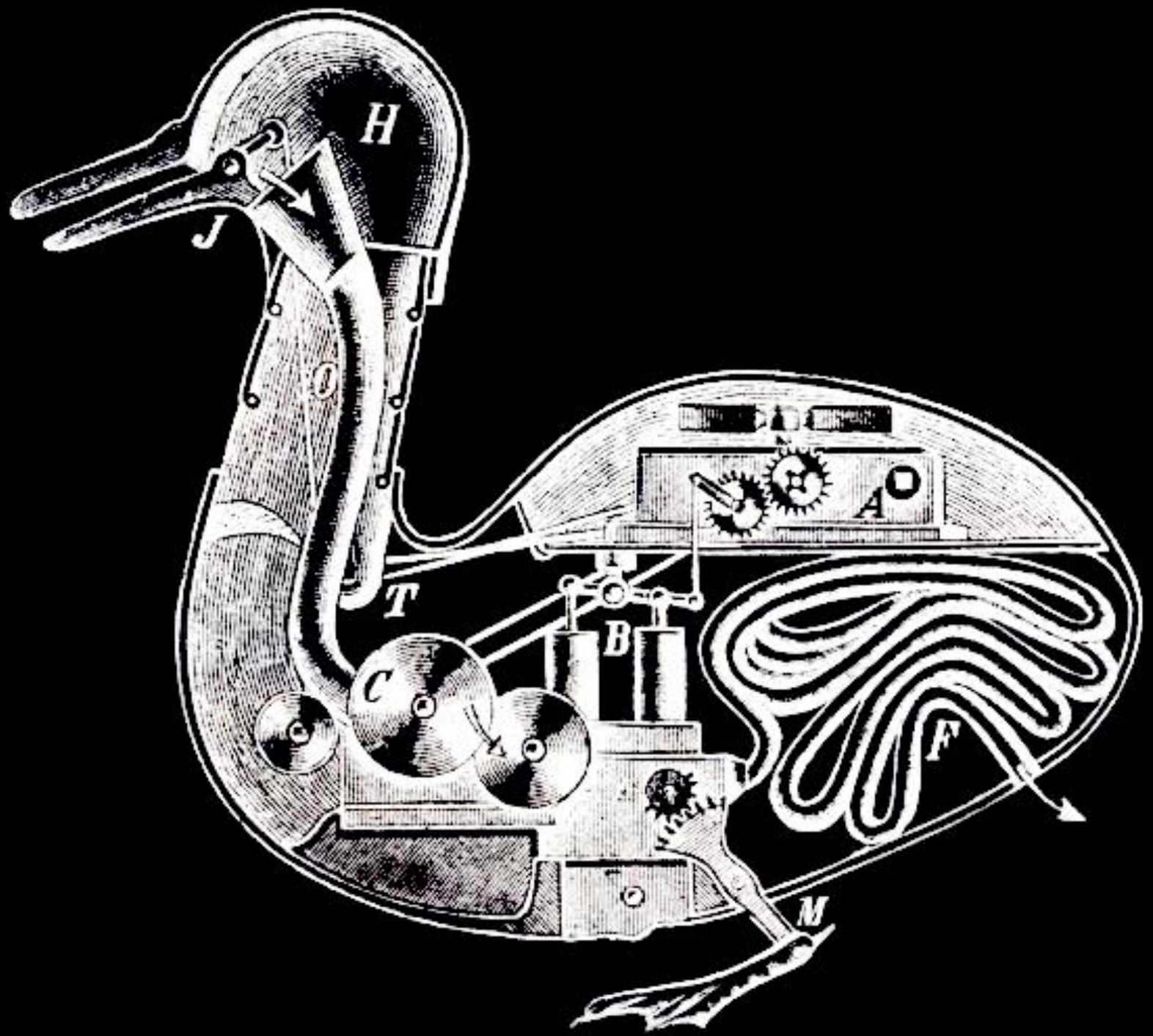
SFU SIMON FRASER UNIVERSITY ENGAGING THE WORLD

MuMe meets NIME

- Basics
- Examples: sound is the interface
- Examples: interfaces for metacontrol

MuMe meets NIME

- Basics


H
J
A
T
B
C
F
M

Basics

Computer creates music that is "in some way shaped by the performance." (Winkler 1998: 4)

Drummond, *Understanding Interactive Systems.*
Organised Sound 14(2), pp124-133, 2009.

Control, Autonomy, Agency

Cybernetics

\ˌsī-bər-ˈne-tiks\ - the science of communication and control theory that is concerned especially with the comparative study of automatic control systems (as the nervous system and brain and mechanical-electrical communication systems)

Merriam Webster Dictionary online
http://www.merriam-webster.com/dictionary/cybernetics

Control, Autonomy, Agency

Communicate (organisms) ⟷ Control (machines)

Ashby (1962):

The converse of organisation is reducibility.

“A ‘machine’ is that which behaves in a machine-like way, namely, that its internal state, and the state of its surroundings, defines uniquely the next state it will go to.”

But for more complex system, consider the “machine with input”, defined by a set *S* of internal states, a set *I* of input states, and a mapping, *f*, of the product set *I* x *S* into *S*.

Control, Autonomy, Agency

Autonomy

Determine one's own future

Agency

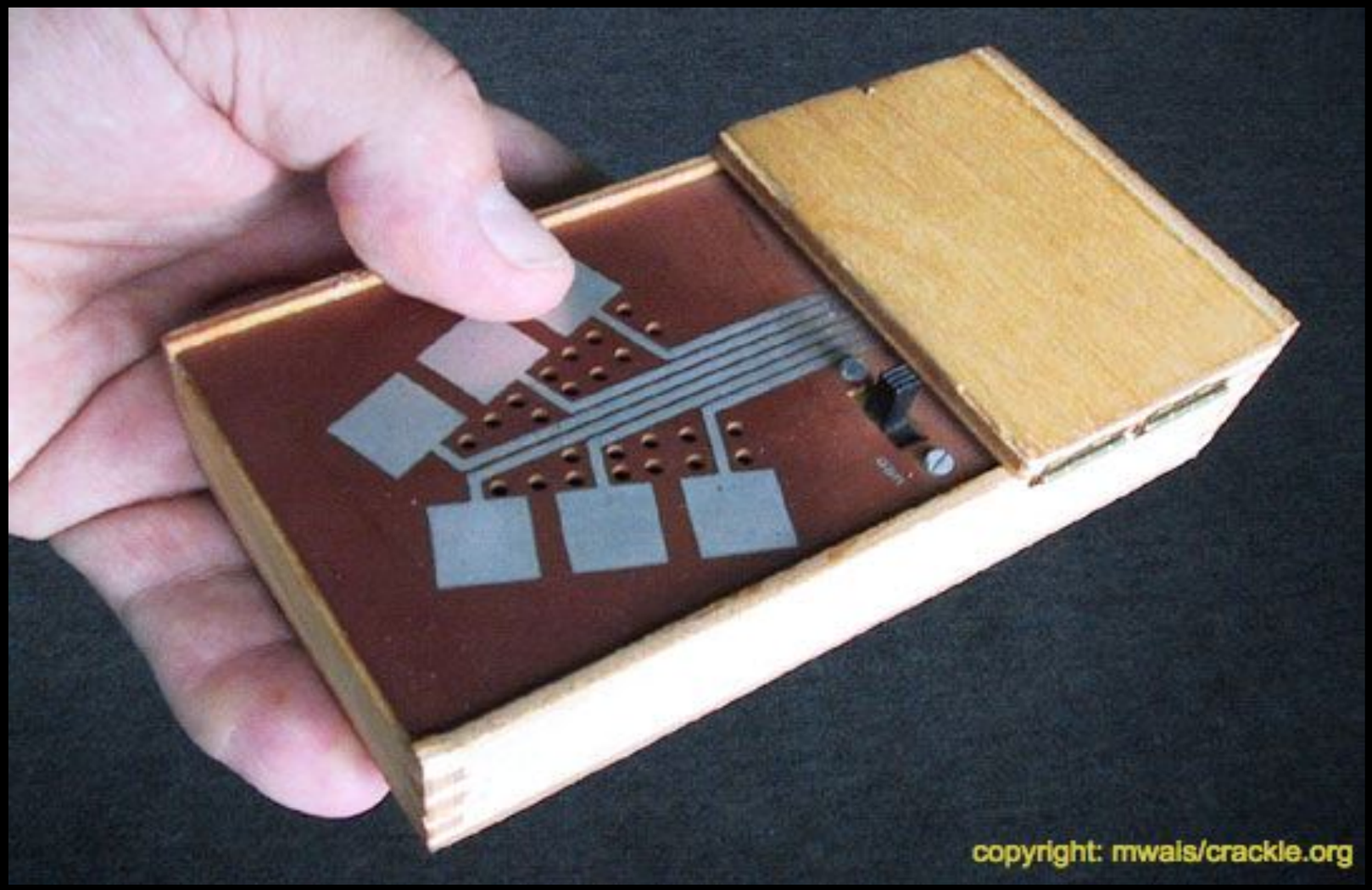
Have an effect on the world

Creativity

Make new *types of thing*

Control, Autonomy, Agency

illusion of control, or “at the edge of control” (Bongers 98)



Control, Autonomy, Agency

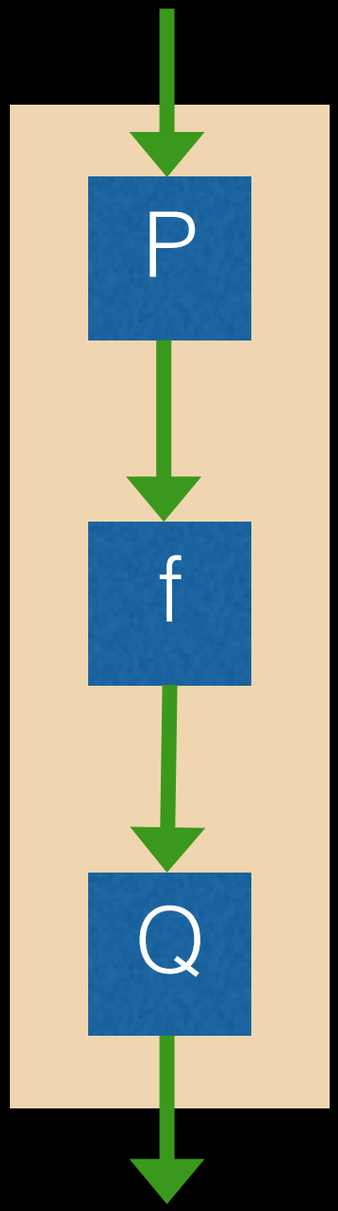
Control, Autonomy, Agency

Memetic Agency →

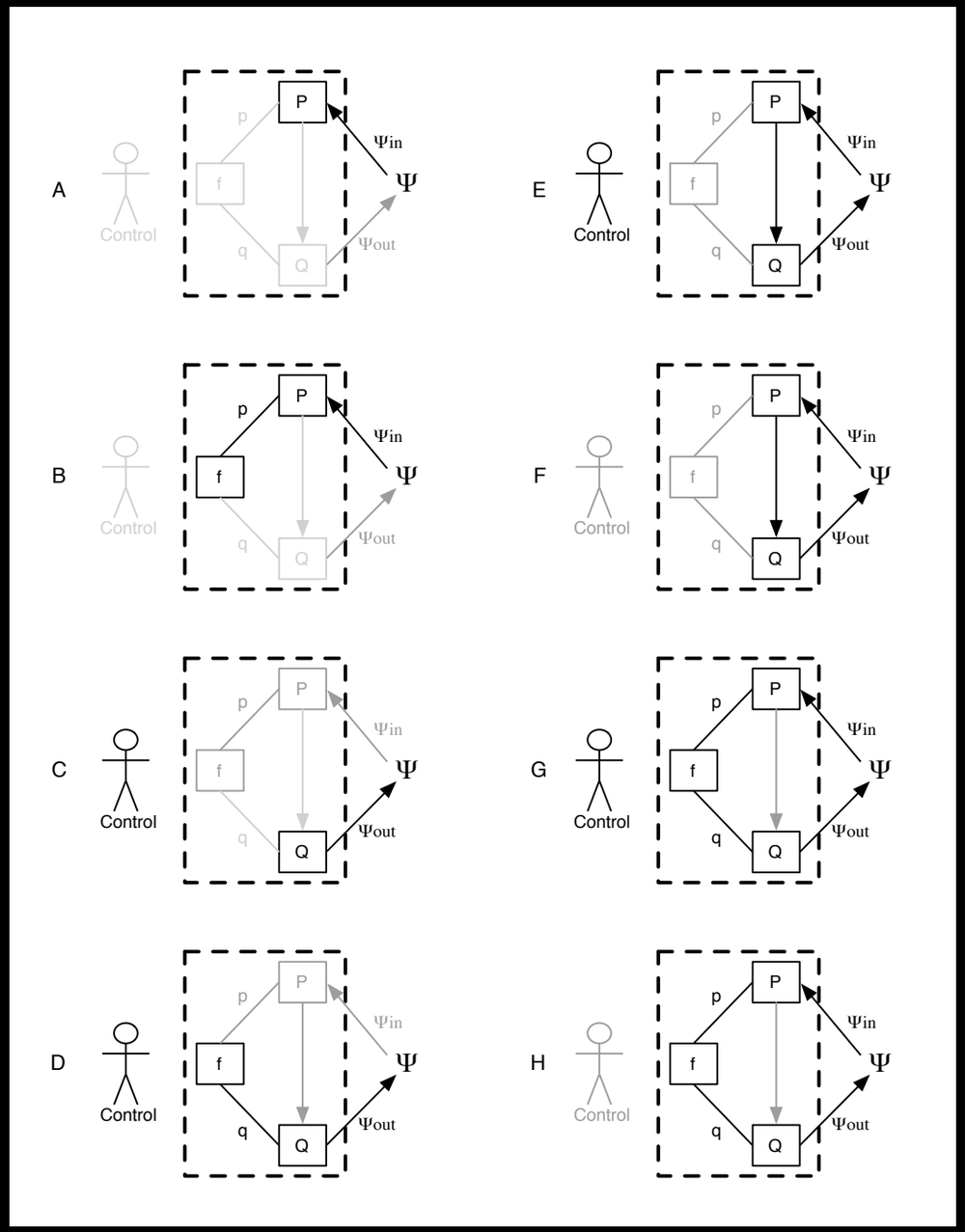
Performative Agency → Performative Agency → Performative Agency → Performative Agency

Bown, Eldridge, McCormack, Understanding Interaction in Contemporary Digital Music: from Instruments to Behavioural Objects, Organised Sound 14(2), 2009.

Blackwell and Young, 2003



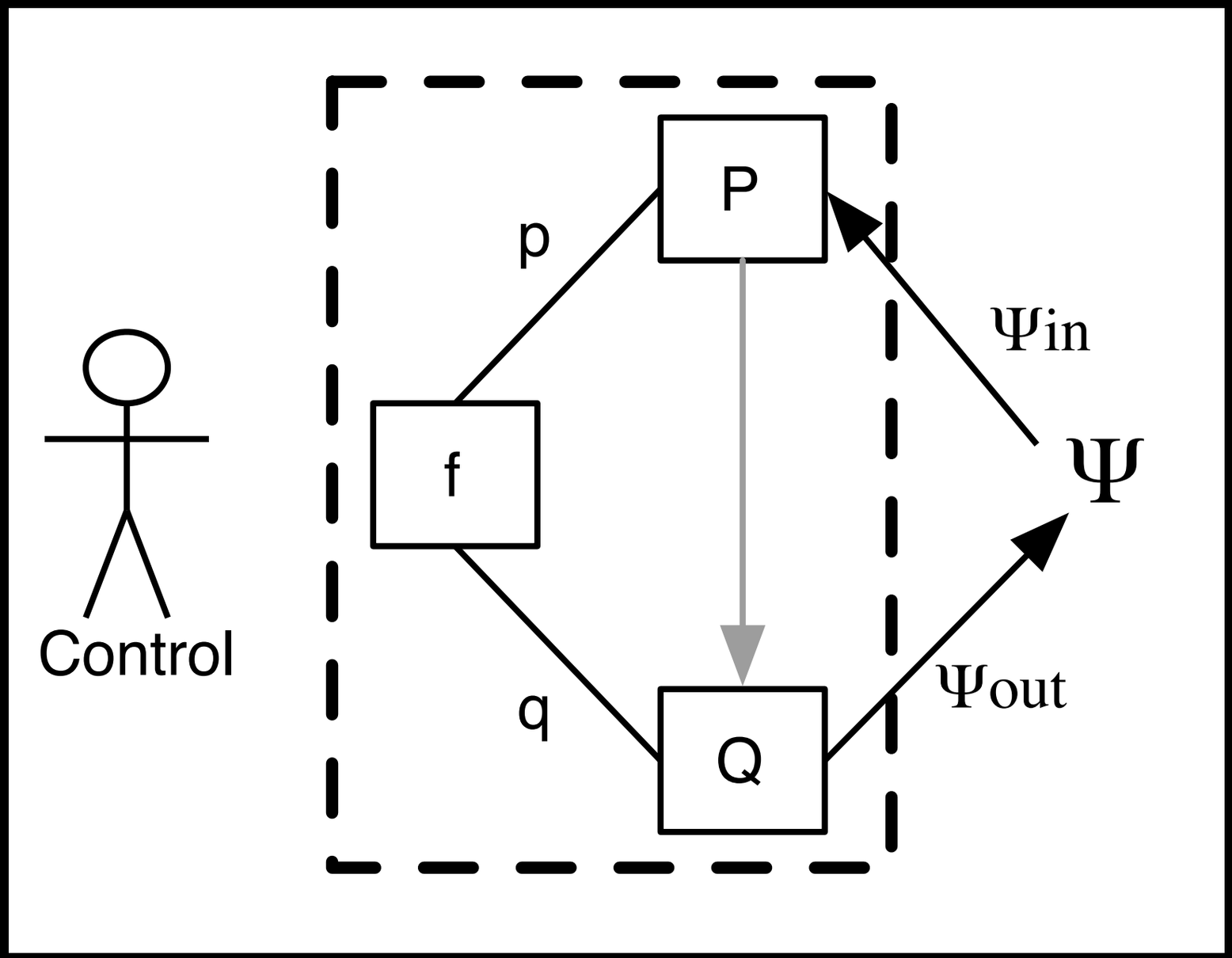
Blackwell, Bown and Young, 2012



PfQ framework is a “talking point”: *1st layer in the “black box”.*

We can always speak of these elements within the system as if they exist, even if we do not know what is actually going on inside.

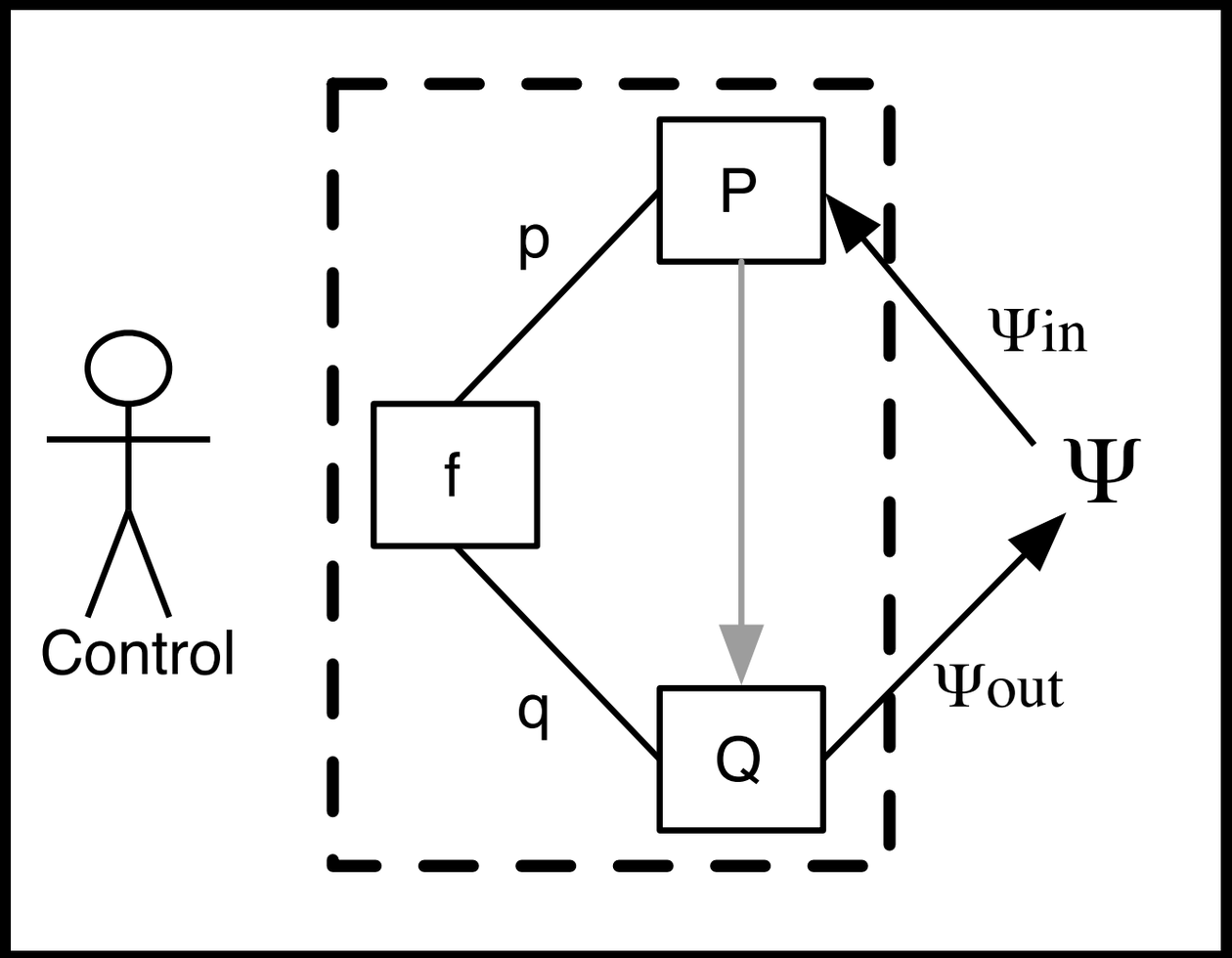
- What can the system hear / perceive / understand (P)?
- How does generation take place (f)?
- What outputs is it capable of (Q) and how are they affected by P and f?
- What else is influencing P, Q or f?



Cf. Bown, Eldridge and McCormack (2009): Behavioural Objects.

MuMe meets NIME

- Examples: sound is the interface

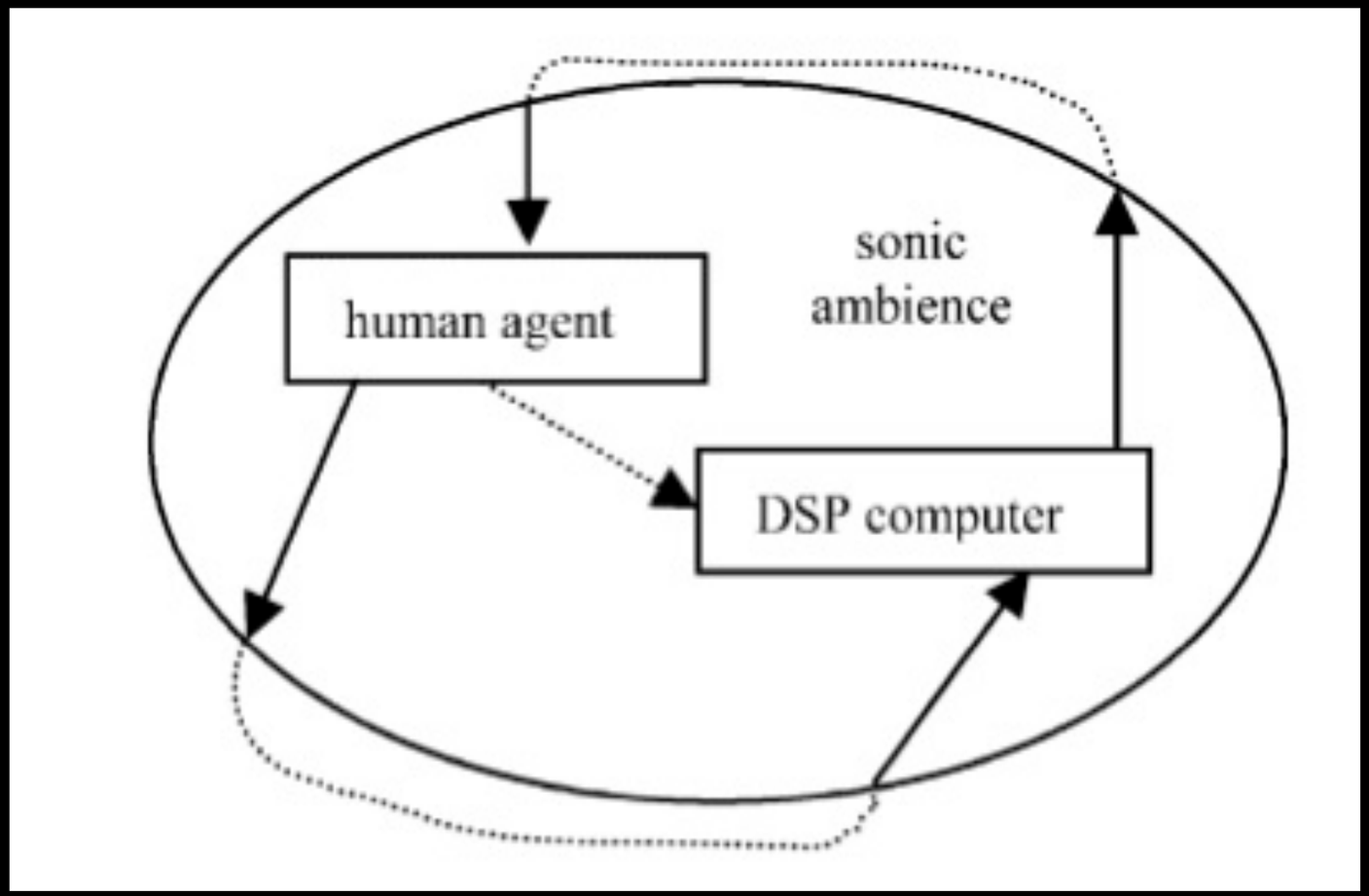


Sound is the Interface

Agostino di Scipio: ‘Sound is the Interface’: From *interactive* to *ecosystemic* signal processing.

Organised Sound 8(3): 269–277, 2003 Cambridge University Press.

Sound is the Interface



an understanding of ‘interaction’ as a network of interdependencies among system components, and as a means for dynamical behaviour to emerge upon the contact of an autonomous system (e.g. a DSP unit) with the external environment (room or else hosting the performance)

Sound is the Interface

Conceptualising interaction in the sonic / musical sphere.

Cf. Bill Gaver (2005), Musical and non-nusical ways of listening.

Gaver, B. What in the World Do We Hear?: An ecological approach to auditory event perception, *Ecological Psychology*, 5(1), 1-29.

Sound is the Interface

Lewis
“Classical” expert system approach.

Examining patterning and concepts of musical interaction.

Sound is the Interface

Pachet's Continuator

A *mirroring* system

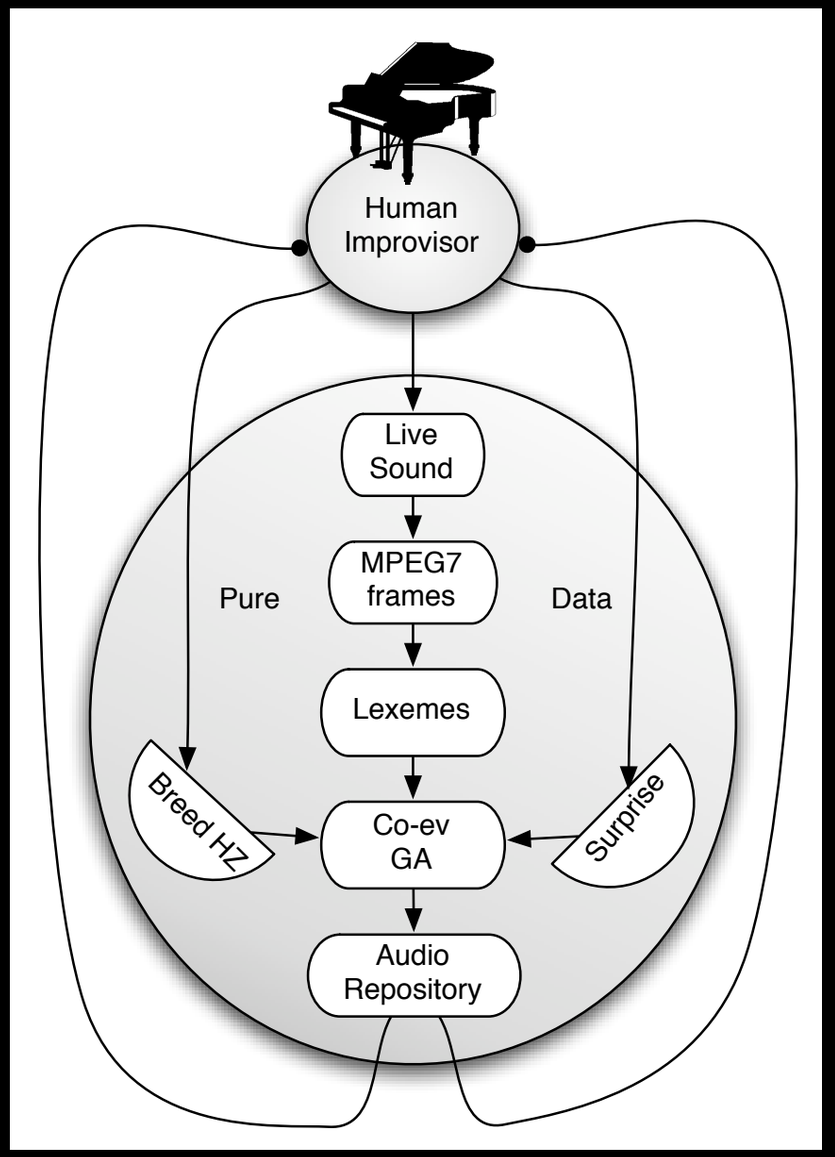
Young and Bown (2010):
shadowing, mirroring, coupling, negotiation.

Sound is the Interface

Casal, Morelli (2007)

Coherent flow of data / choice of data type, thr ough PfQ framework.

In this case, Casey's a udio lexeme approach.



Sound is the Interface

Nick Collins, PhD Thesis, 2007.

“Through rehearsal, we had realised that it was helpful if at some points, the human performer calm themselves and provide a relatively stable beat to help the computer match up again, lest the dynamics of the playing situation become too free. This established a compromise between demonstrating the power of the technology, and the fun of evading synchronisation capture!”

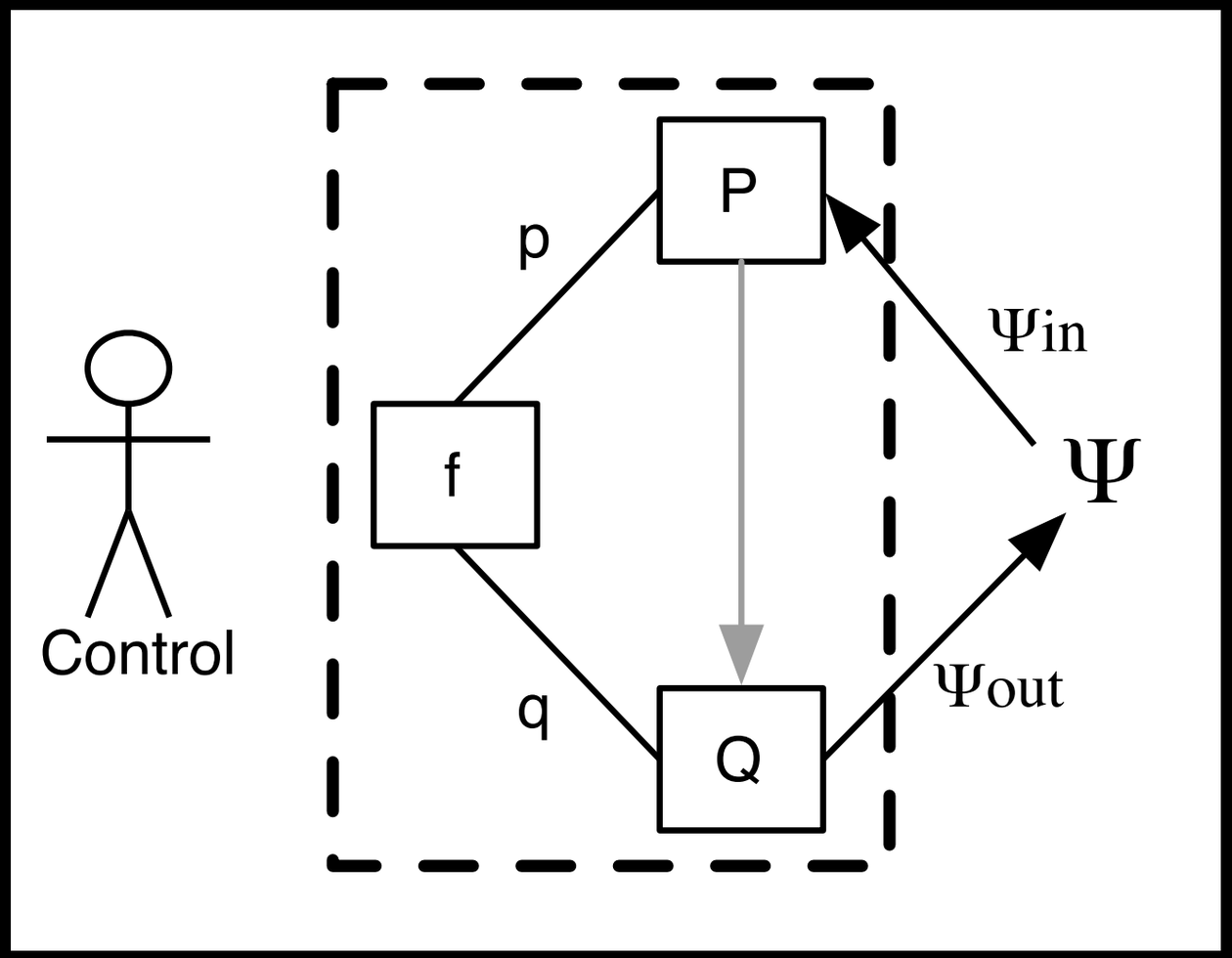
Sound is the Interface

Michael Young, *"_prosthesis"* series

LAM 2005?

MuMe meets NIME

- Examples: interfaces for metacontrol



Interfaces for Metacontrol

- Live versus non-live
- Parameters (generative and perceptual)
- Selection
- Search
- Interaction between elements (configuration)

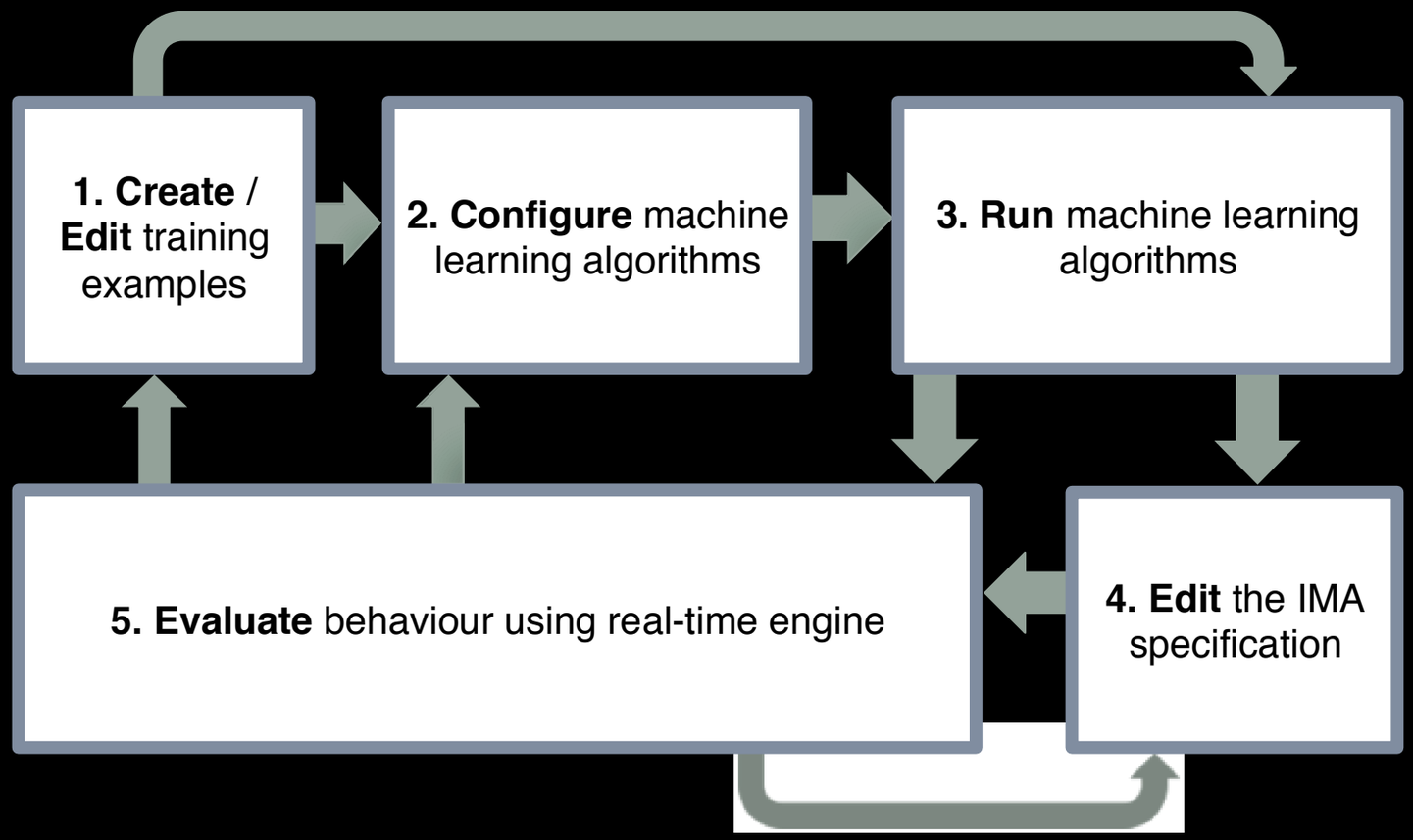
Interfaces for Metacontrol

- Live versus non-live

Interfaces for Metacontrol

- Live versus non-live

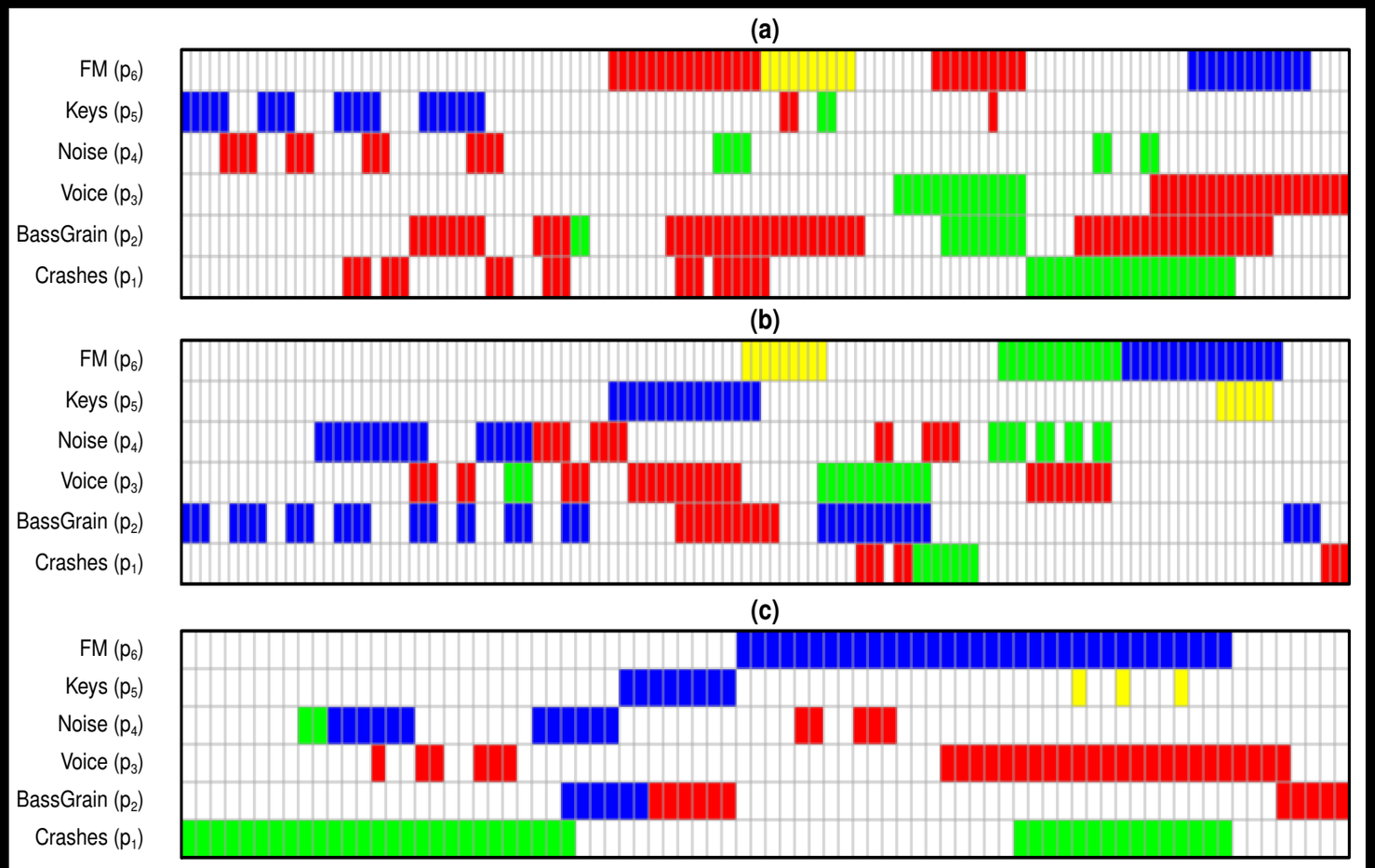
Aengus Martin, Machine learning system requires input of user knowledge: training data + feature selection.



Martin et al. A Toolkit for Designing Interactive Musical Agents, Proceedings of OzCHI 2011.

Interfaces for Metacontrol

- Live versus non-live



Name	Symbol	$\lvert\mathcal{U}\rvert$	Crit Val	Formula
ANY GREATER THAN	$>_{\text{ANY}}$	≥ 1	$c \in \mathbb{Z}$	$p_{x,j} = \begin{cases} 0; & p_{i,j} \leq c, (i \in \mathcal{U}) \\ 1; & \text{otherwise} \end{cases}$
ALL GREATER THAN	$>_{\text{ALL}}$	≥ 1	$c \in \mathbb{Z}$	$p_{x,j} = \begin{cases} 1; & p_{i,j} > c, (i \in \mathcal{U}) \\ 0; & \text{otherwise} \end{cases}$
ANY LESS THAN	$<_{\text{ANY}}$	≥ 1	$c \in \mathbb{Z}$	$p_{x,j} = \begin{cases} 0; & p_{i,j} \geq c, (i \in \mathcal{U}) \\ 1; & \text{otherwise} \end{cases}$
ALL LESS THAN	$<_{\text{ALL}}$	≥ 1	$c \in \mathbb{Z}$	$p_{x,j} = \begin{cases} 1; & p_{i,j} < c, (i \in \mathcal{U}) \\ 0; & \text{otherwise} \end{cases}$
ANY NON-ZERO	NZ_{ANY}	≥ 1		$p_{x,j} = \begin{cases} 0; & p_{i,j} = c, (i \in \mathcal{U}) \\ 1; & \text{otherwise} \end{cases}$
ALL NON-ZERO	NZ_{ALL}	≥ 1		$p_{x,j} = \begin{cases} 1; & p_{i,j} \neq c, (i \in \mathcal{U}) \\ 0; & \text{otherwise} \end{cases}$
ALL EQUAL	$=$	≥ 2		$p_{x,j} = \begin{cases} 1; & p_{i,j} = p_{k,j}, (i,k \in \mathcal{U}) \\ 0; & \text{otherwise} \end{cases}$
NOT ALL EQUAL	$\neq$	≥ 2		$p_{x,j} = \begin{cases} 0; & p_{i,j} = p_{k,j}, (i,k \in \mathcal{U}) \\ 1; & \text{otherwise} \end{cases}$
ALL EQUAL TO	$==$	≥ 1	$c \in \mathbb{Z}$	$p_{x,j} = \begin{cases} 1; & p_{i,j} = c, (i \in \mathcal{U}) \\ 0; & \text{otherwise} \end{cases}$
NOT ALL EQUAL TO	$\neq\neq$	≥ 1	$c \in \mathbb{Z}$	$p_{x,j} = \begin{cases} 0; & p_{i,j} = c, (i \in \mathcal{U}) \\ 1; & \text{otherwise} \end{cases}$
SUM	Σ	≥ 2		$p_{x,j} = \sum_{i \in \mathcal{U}} p_{i,j}$
PREVIOUS	PREV	$= 1$		$p_{x,j} = \begin{cases} p_{i,j-1}, (j > 1) \\ p_{i,j}, (j = 1) \end{cases}$
COUNT	COUNT	$= 0$	$c > 1$	$p_{x,j} = j \mod c$
COMBO	COMBO	≥ 2		See Text
BLOCK	BLOCK	$= 1$	$c > 1$	See Text

Table 5.8: The custom variable types available in the Agent Designer Toolkit at the time of writing. The symbol $p_{x,j}$ denotes the value of the custom variable with index x at time j.

Interfaces for Metacontrol

- Parameters (generative and perceptual)

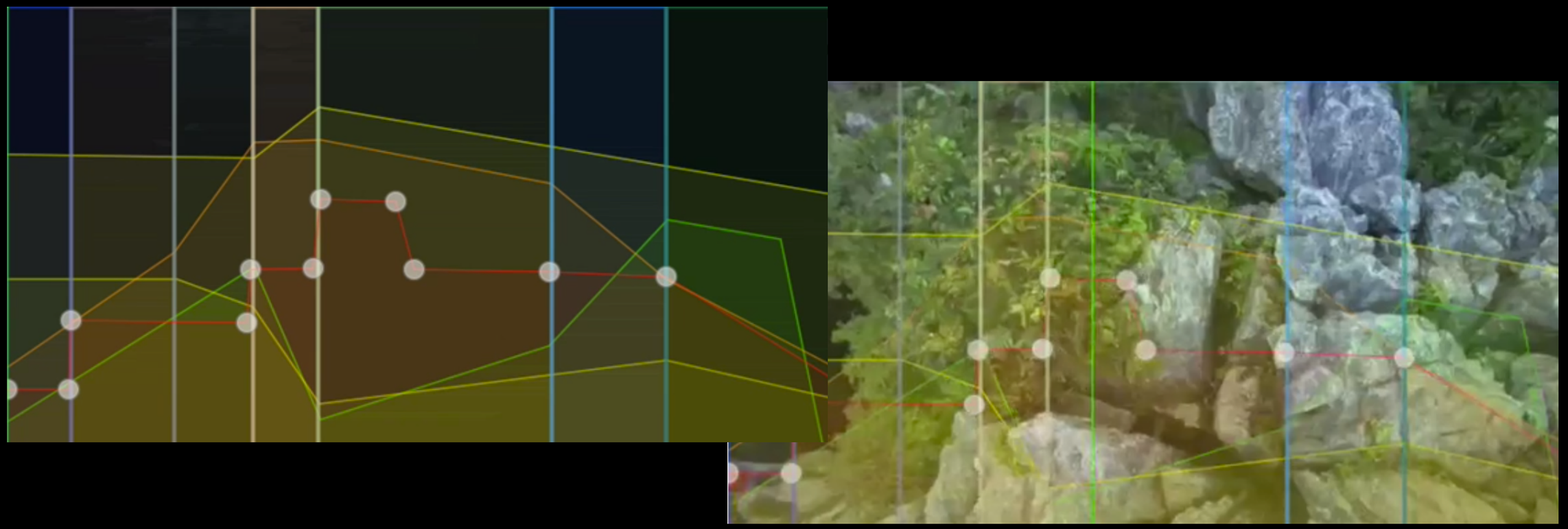
Interfaces for Metacontrol

- Parameters (generative and perceptual)

Arne Eigenfeldt, “Drum circle: Intelligent agents in max/msp”, *Proceedings of the International Computer Music Conference* 2007.

Interfaces for Metacontrol

- Parameters (generative and perceptual)



https://vimeo.com/23344565

Sorensen et al. “A Computational Model For The Generation Of Orchestral Music In The Germanic Symphonic Tradition: A progress report”, *Proceedings of Sound : Space - The Australasian Computer Music Conference*, Sydney. ACMA, pp. 78-84.

mamas sfu designlab

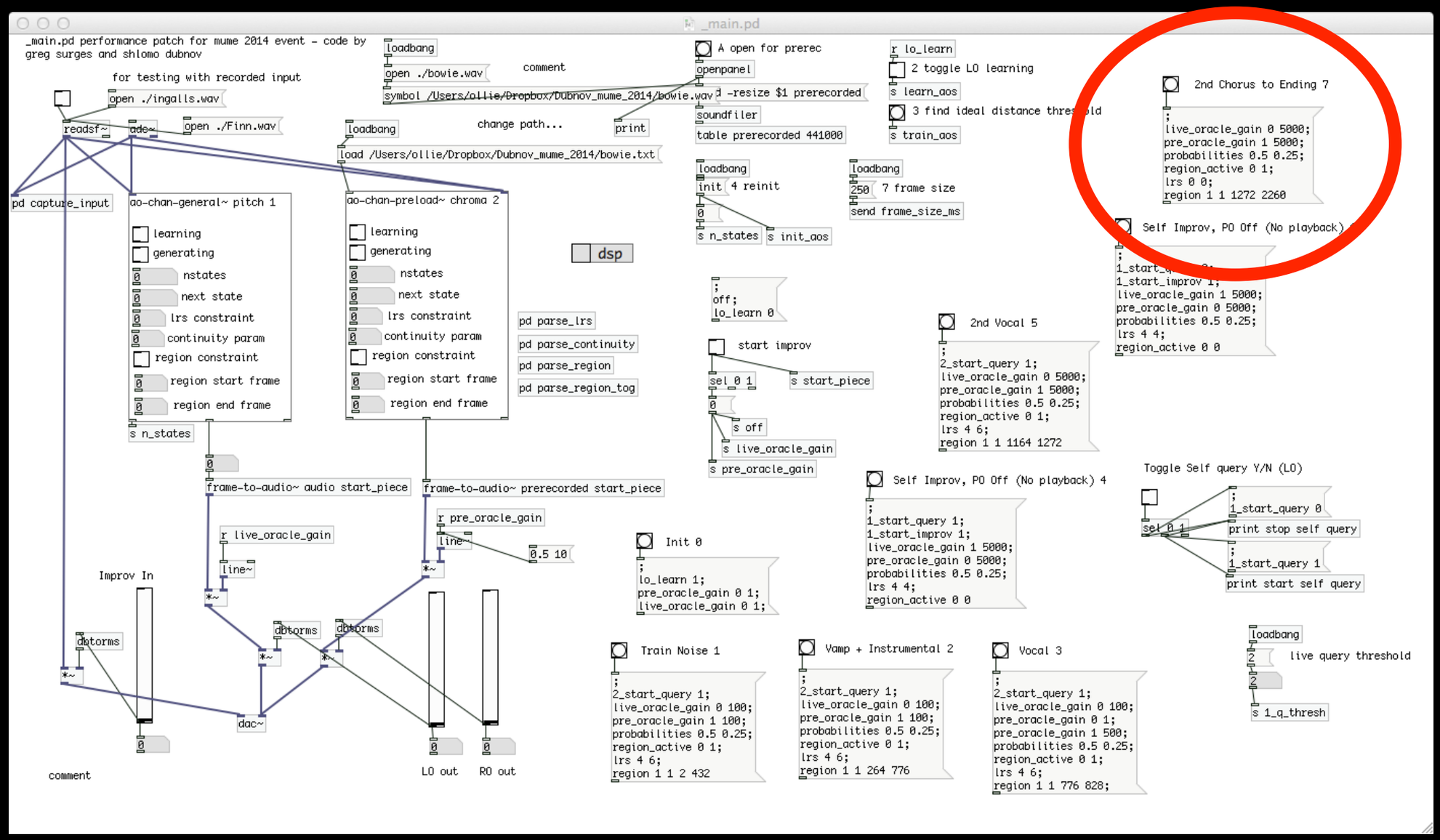
Interfaces for Metacontrol

- Selection

Interfaces for Metacontrol

- Selection

Dubnov and Surges, PyOracle, MuMe Concert 2014.

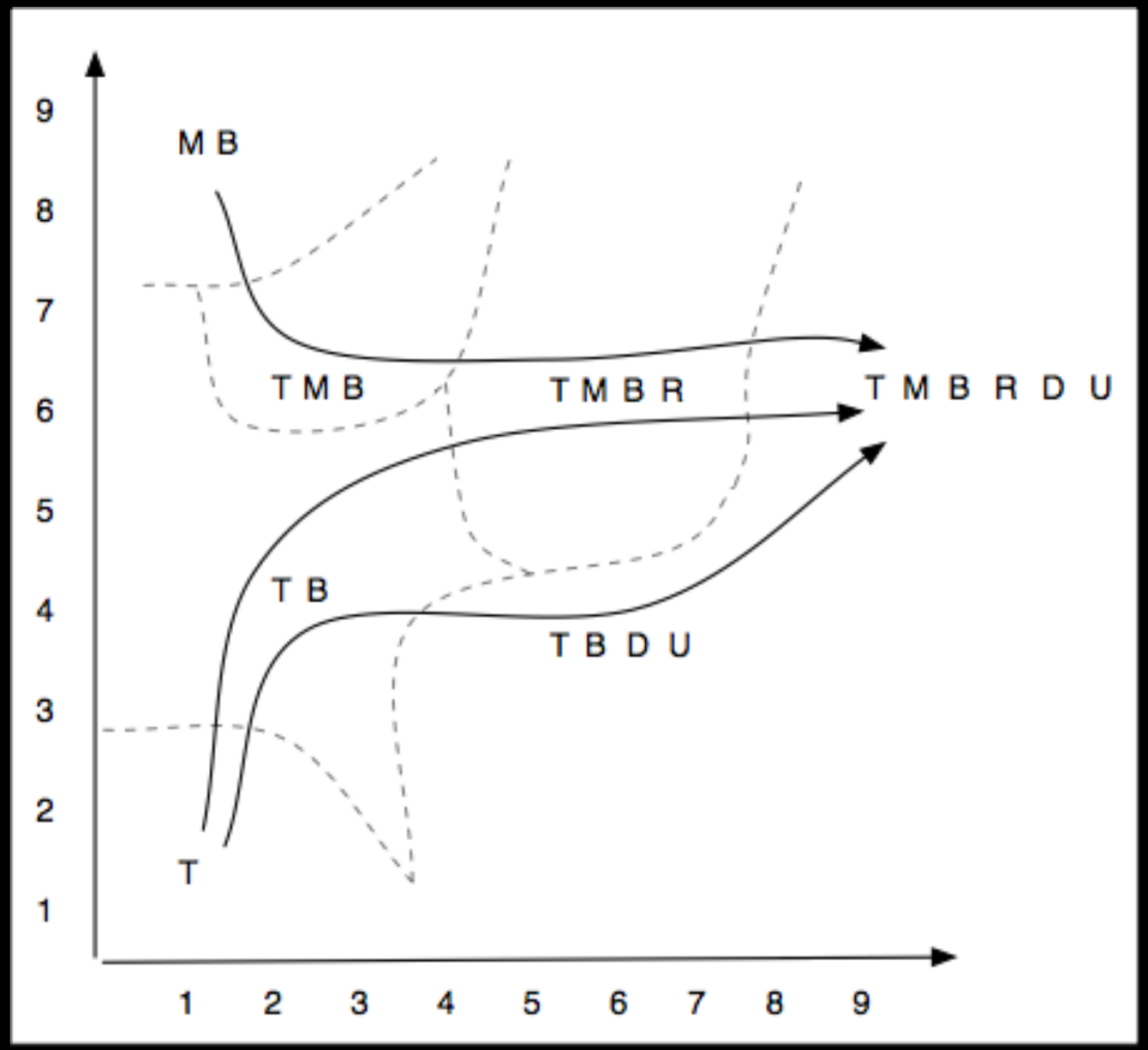


Interfaces for Metacontrol

- Selection

Icarus:
Fake Fish Distribution

Musical Metacreation
Workshop 2013.

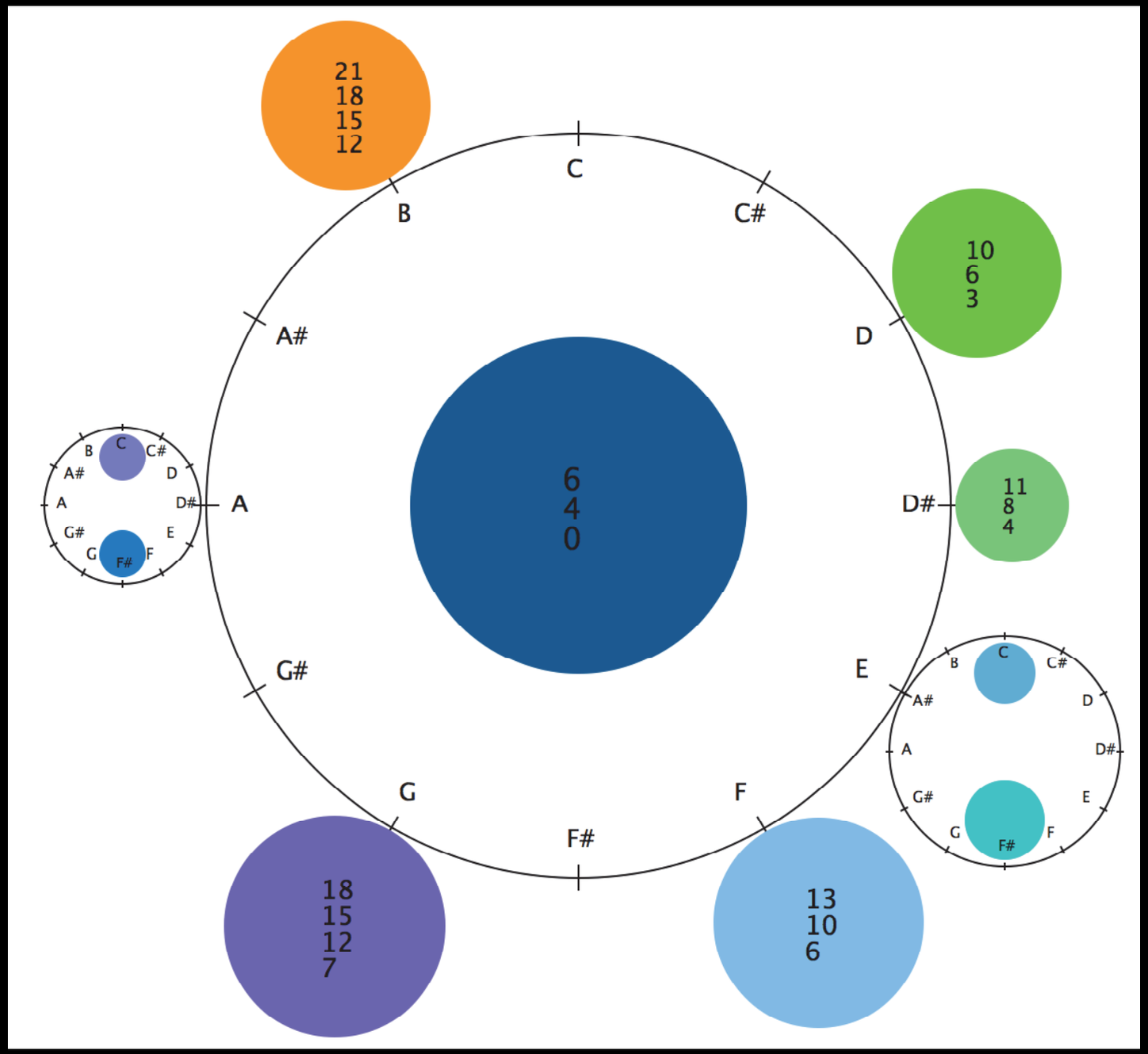


Interfaces for Metacontrol

- Selection

Manaris et al.
Harmonic Navigator.

Musical Metacreation
Workshop 2013.



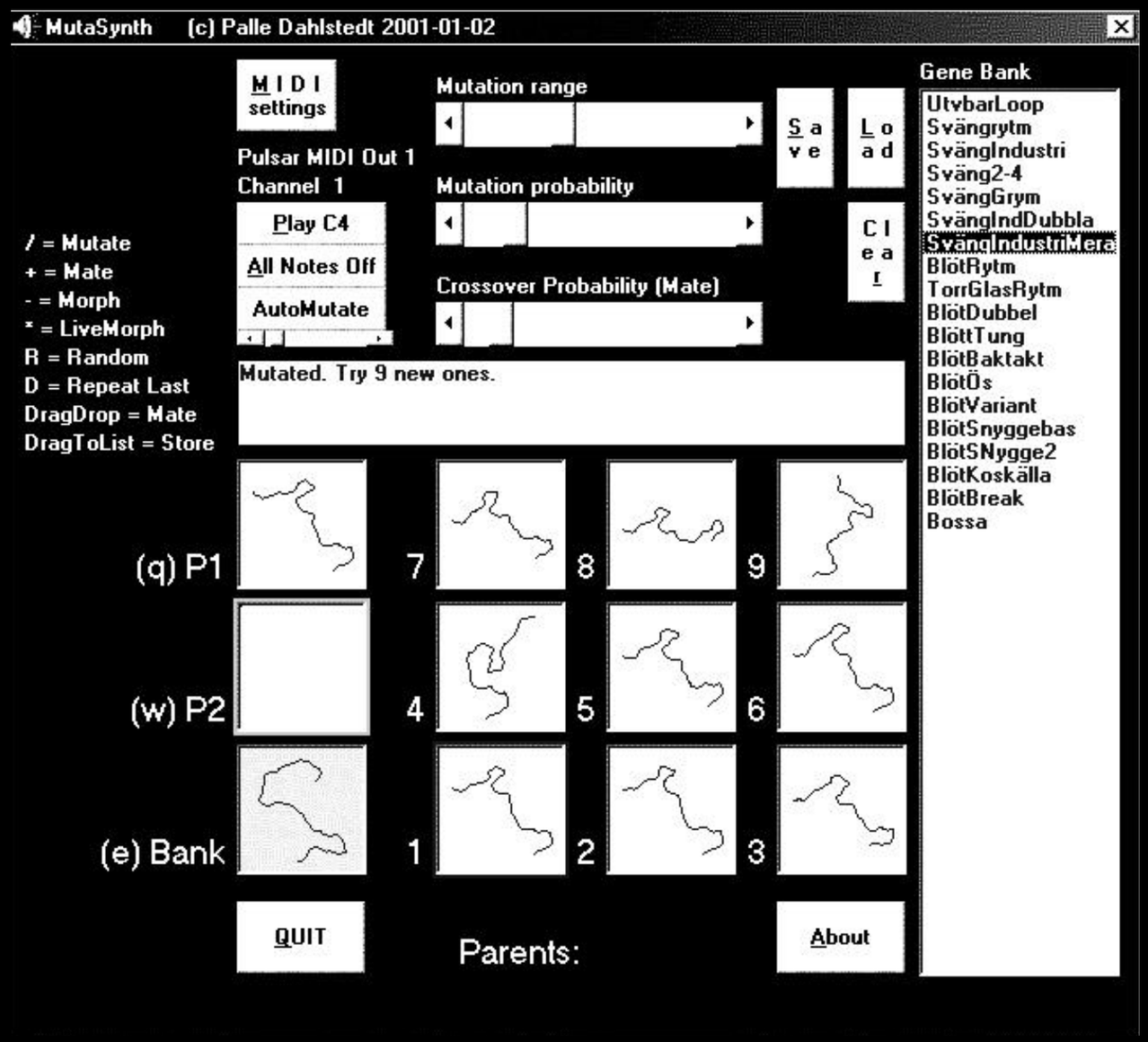
Interfaces for Metacontrol

- Search

Interfaces for Metacontrol

- Search

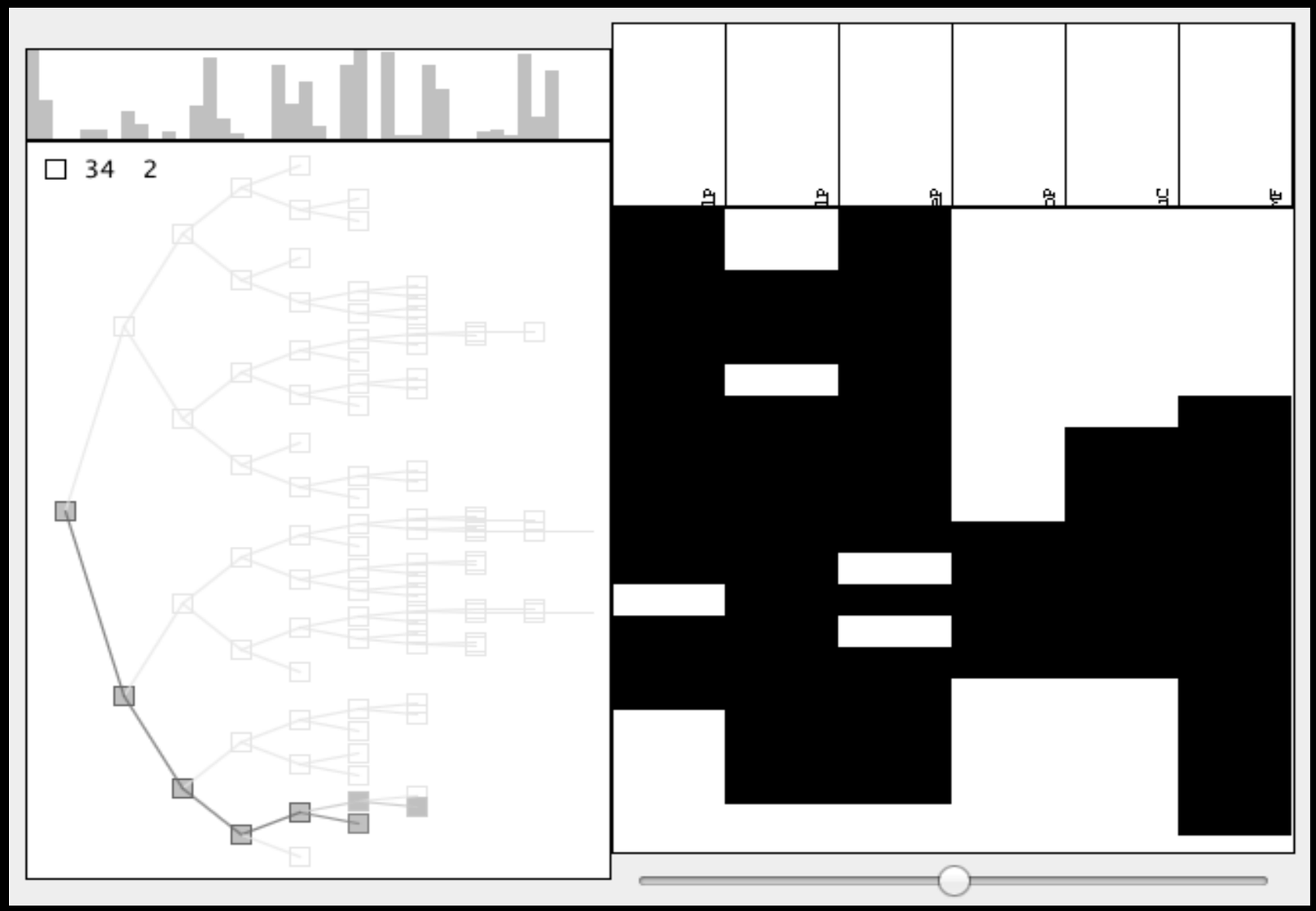
Dahlstedt – live and non-live search



Interfaces for Metacontrol

- Search

Bown – Non-live search

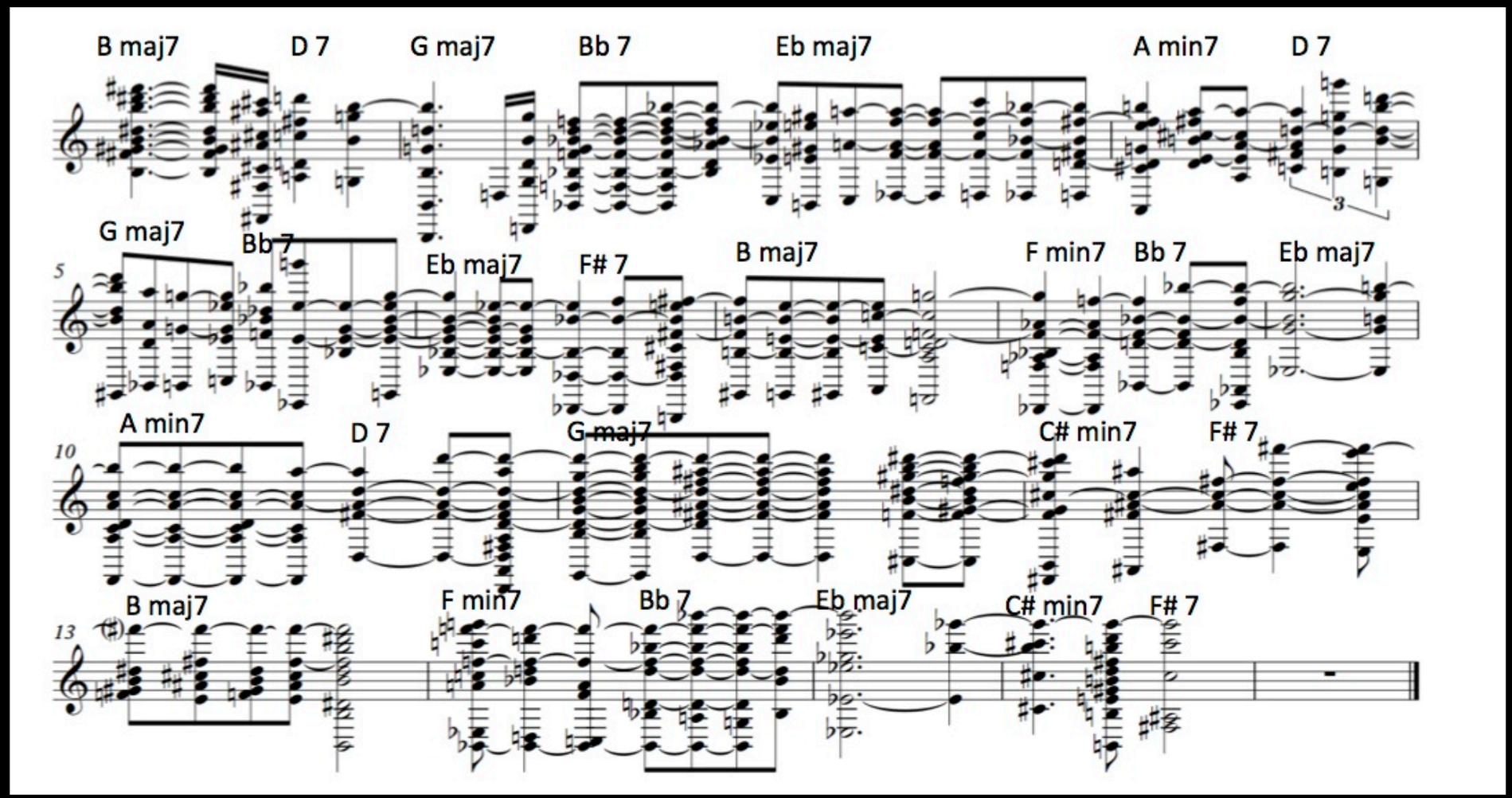


Interfaces for Metacontrol

- Interaction between elements (configuration)

Interfaces for Metacontrol

- Interaction between elements (configuration)



Giant Steps harmonized in the style of Wagner. From Pachet, F, Non-Conformant Harmonization, Proceedings of ICCC 2014.

MuMe meets NIME

Special form of interaction design, combining control and more obscure/advanced forms of interaction.
Open research area.

Tools to support creative practice: how can I configure and organise autonomous/creative beahvaiour?