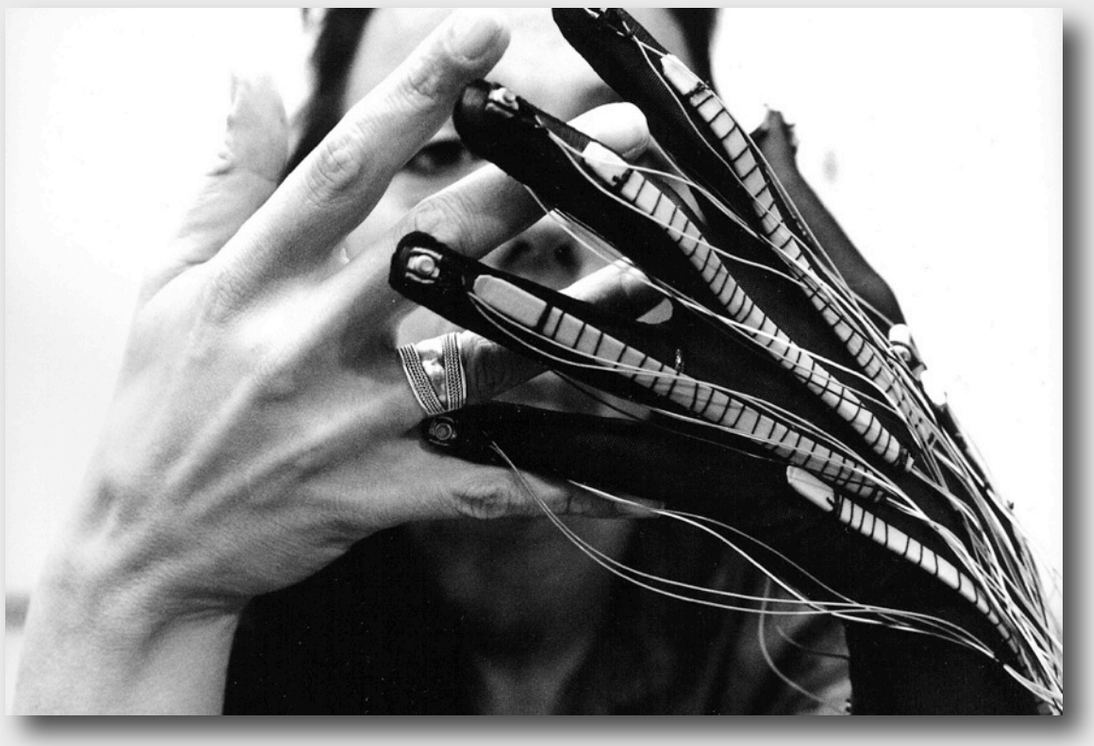
Thomas Ciufo
Improvising with Computers

Will we be Assimilated?



Will we be Assimilated?

Roger Dean: Can computer interaction provide unique opportunities/outputs?

George Lewis: I'm taking this to be a version of the FAQ "What do you get out of improvising with computers to you don't get from improvising with people?”

I invert this question to maintain that the most important formal issues in this sort of music concern how a program operating in a conceptual space compatible with group improvisation might have the same set of problems as the human musician – namely, how sonic behavior, communication, personal narrative, and intersubjectivity affect musical form. (Dean 2003)

Overview

approaches to computer-mediated improvisation

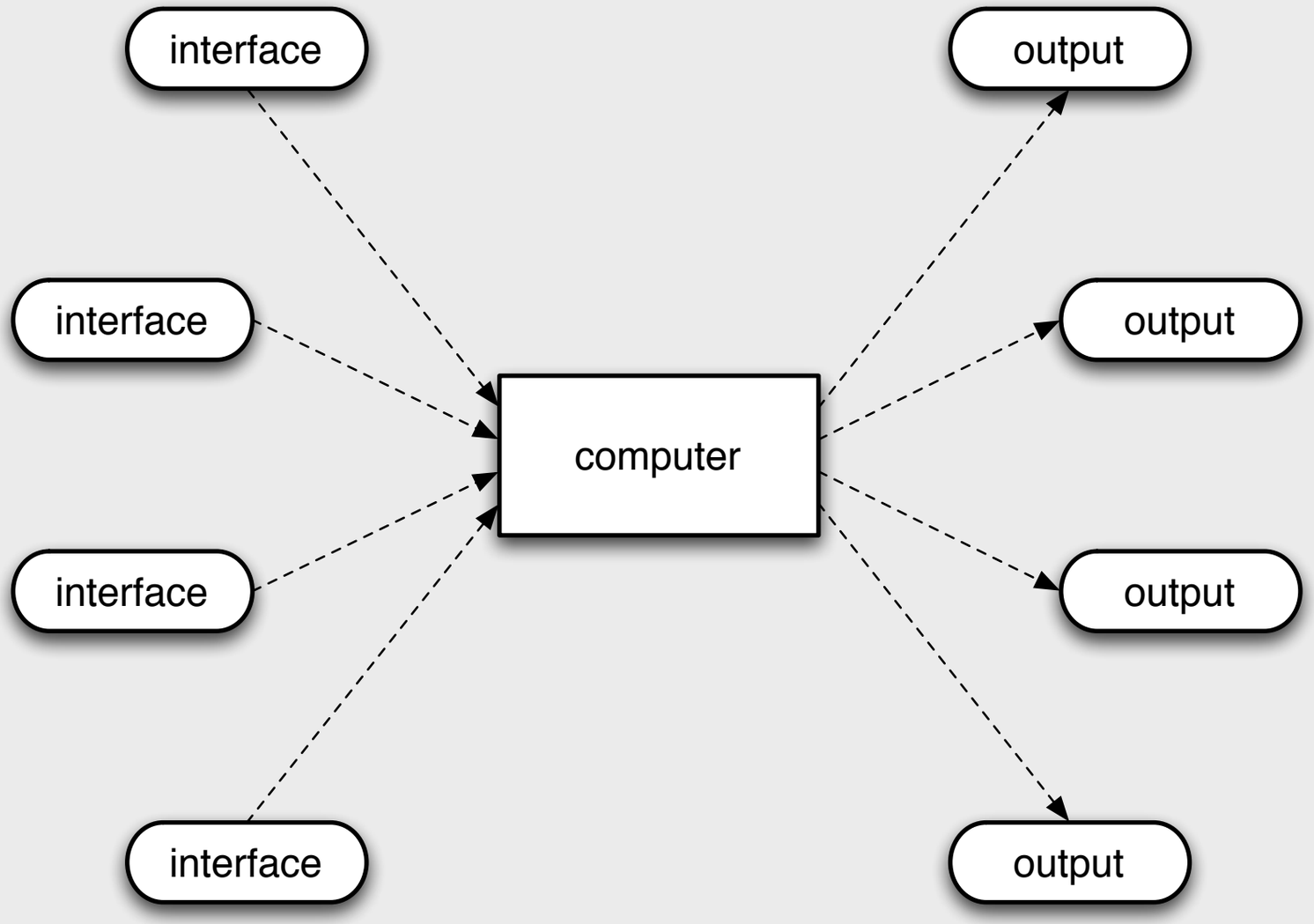
design models

roles and relationships

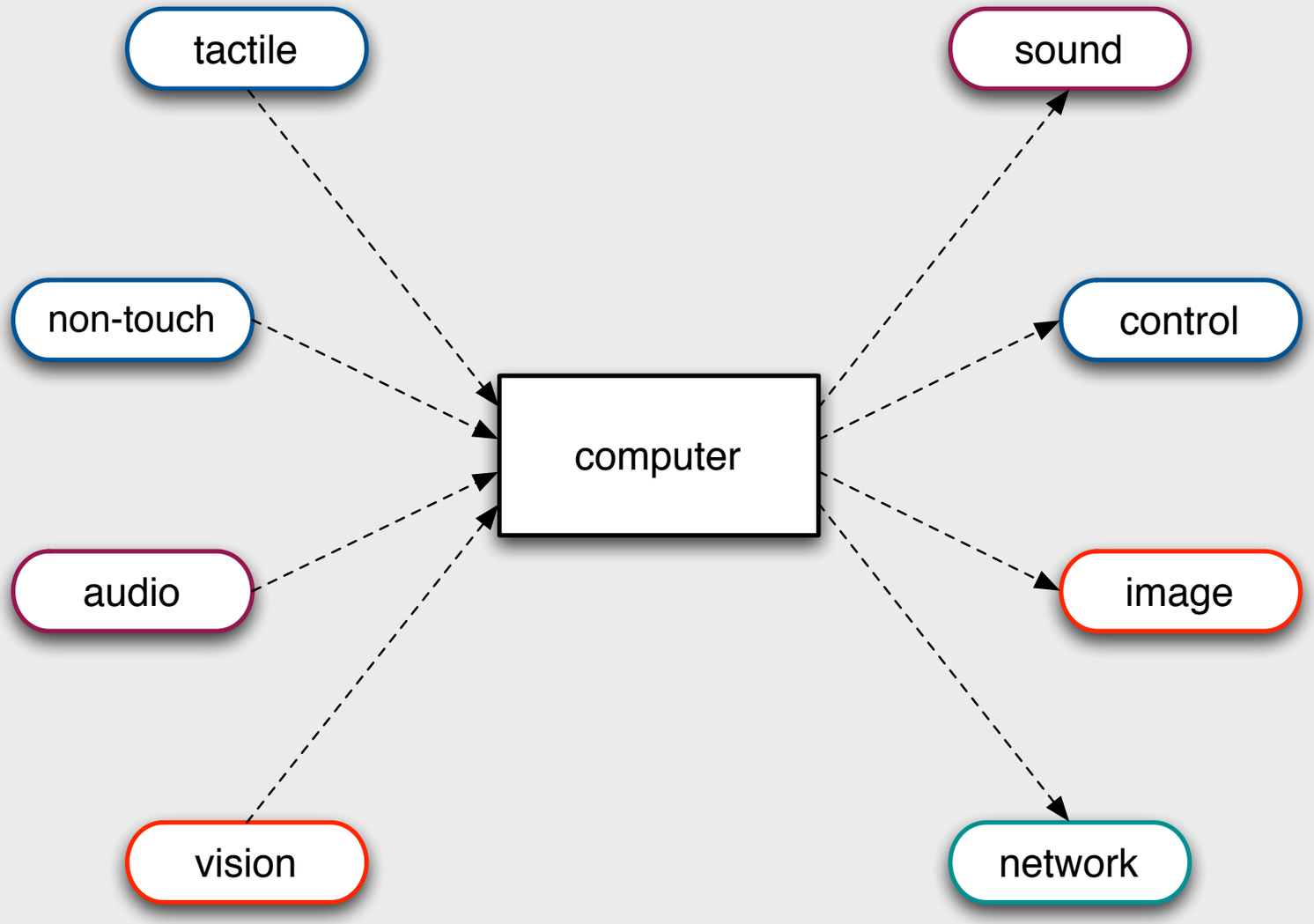
general design strategies

challenges / benefits

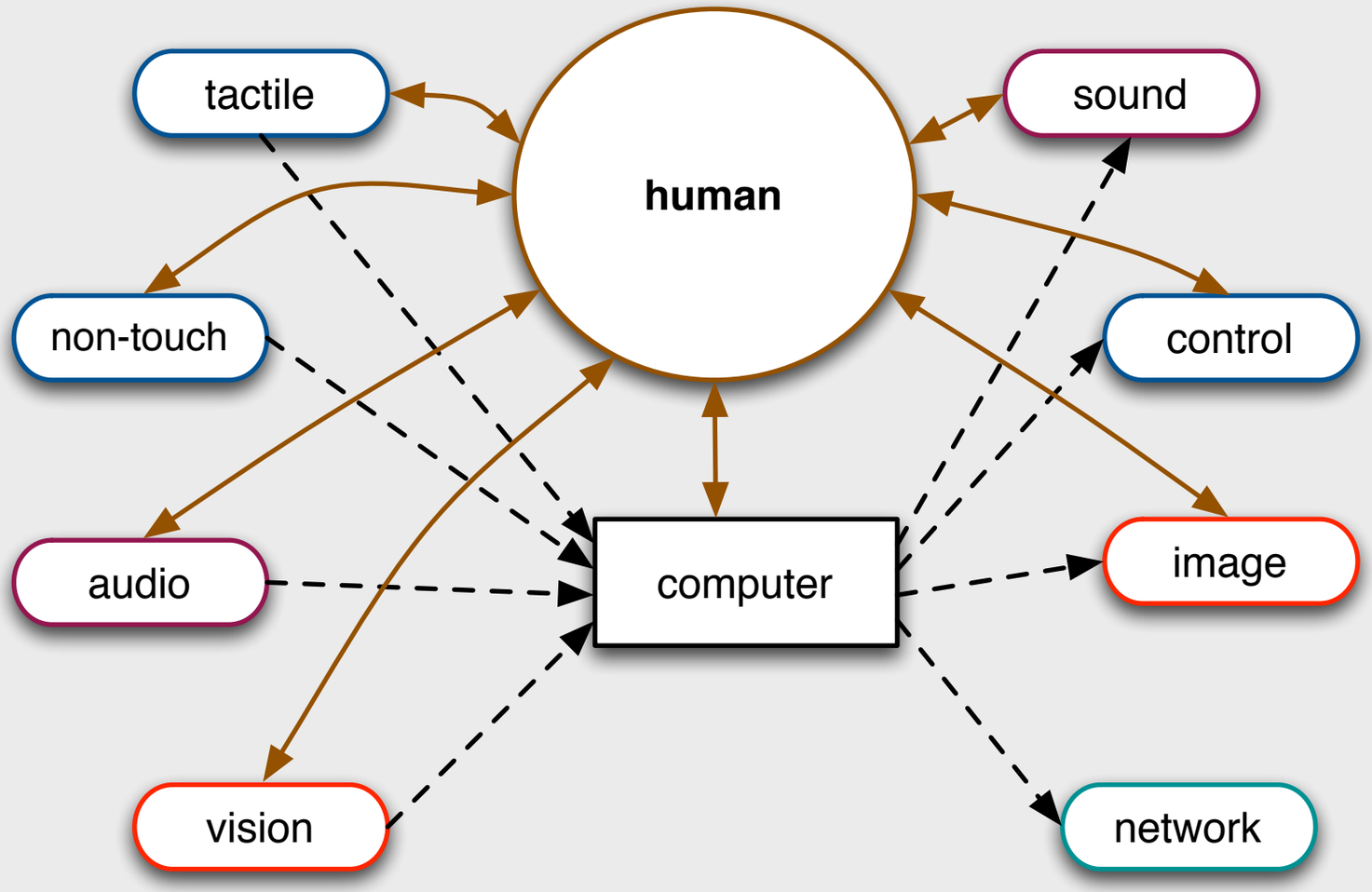
Computer Enhanced Performance



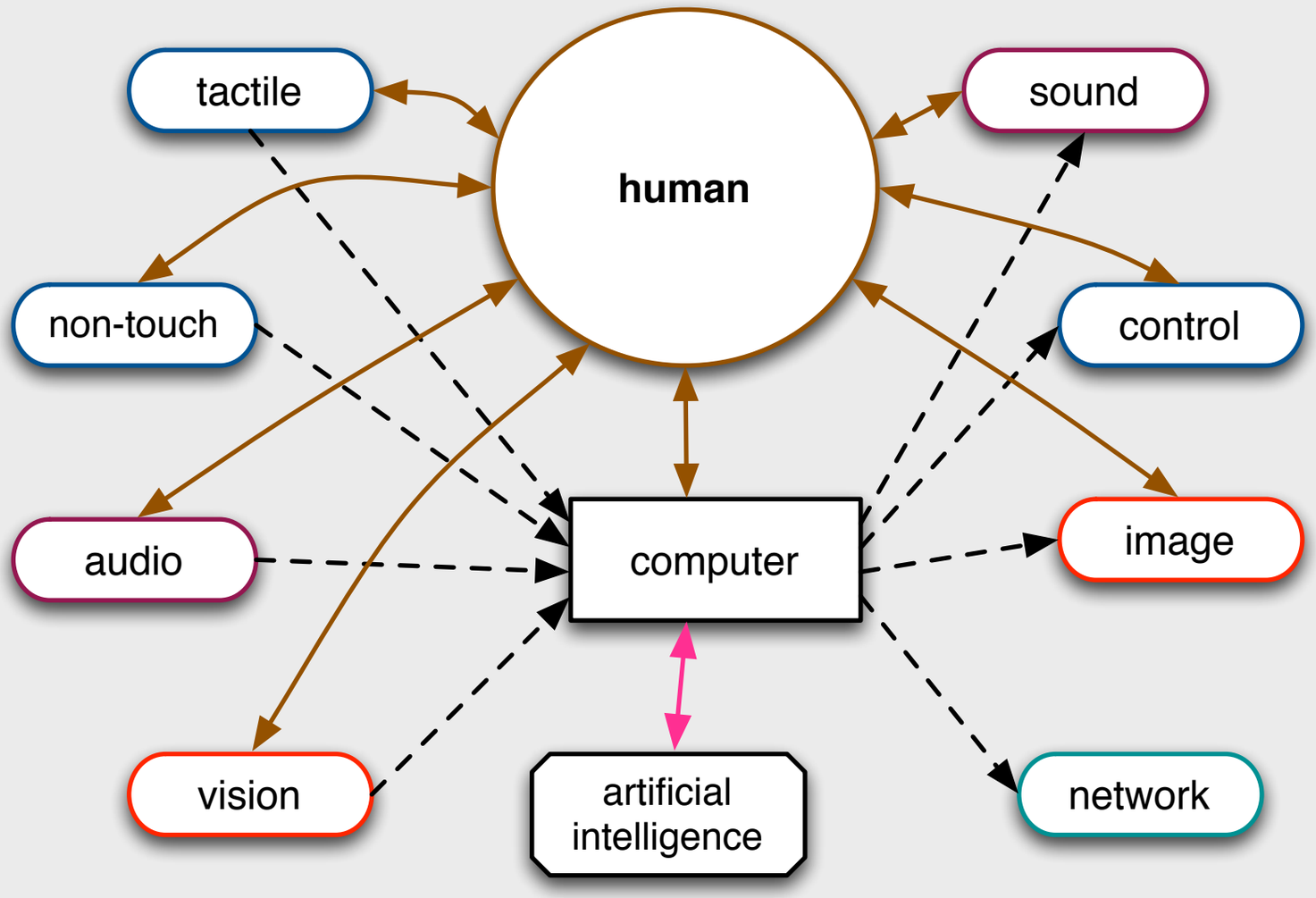
Computer Enhanced Performance



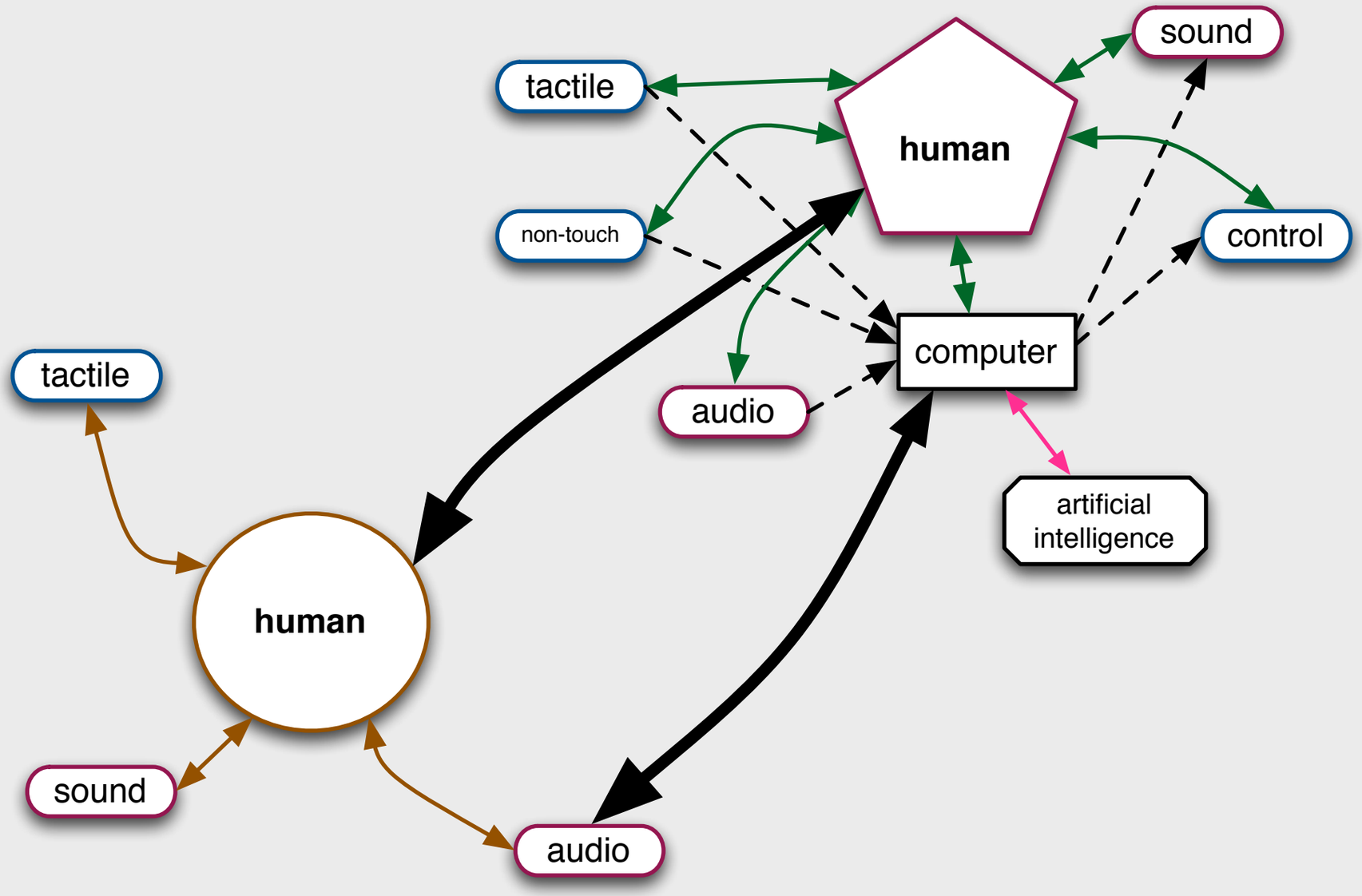
Computer-Mediated Performance



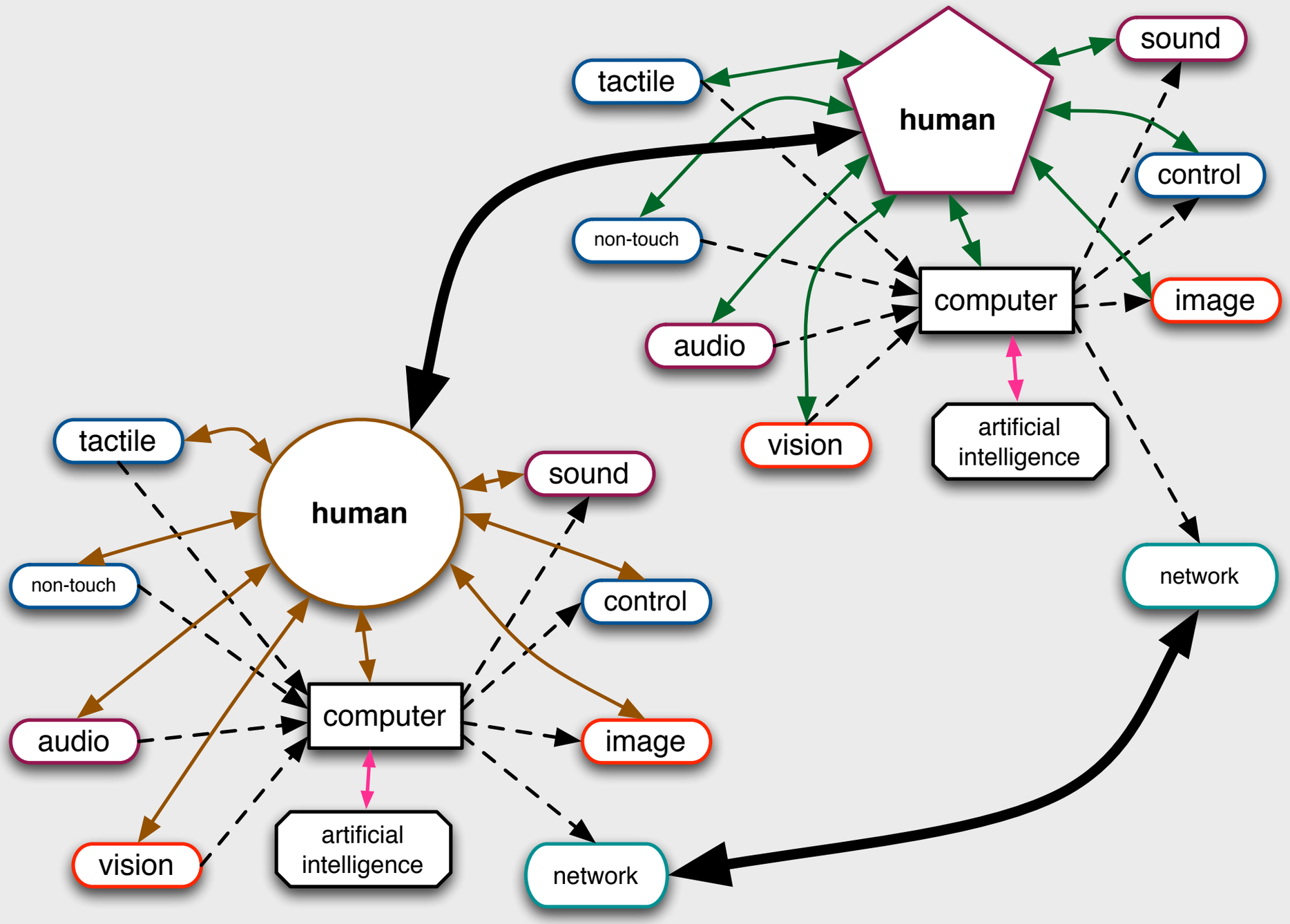
Computer-Mediated Performance with AI



Duo / Shared Mediation



Ensemble / Distributed Performance



Interaction Models

instrument / player (Rowe)

voyager (Lewis)

hyperinstrument (Machover)

expanded instrument system (Oliveros)

composed instrument (Wanderley, Schnell, Bahn etc)

Human-Computer Relationships / Behaviors

control: dependent / autonomous

identity: predictable / unpredictable

attitude: agreeable / antagonistic

context awareness: listens / ignores

memory: remembers / forgets

time domain: anticipate / reacts

energy: actuated / independent

adaptability - do these change over time?

Practical Design Strategies

Design Strategies: Computer Improvisation

pliability

adaptability - change behaviors during performance

context awareness

hybrid / multilevel / metalevel control

Three Meditations

Beginner's Mind

Beginner's Mind - Motivations

work with a wide range of sound sources

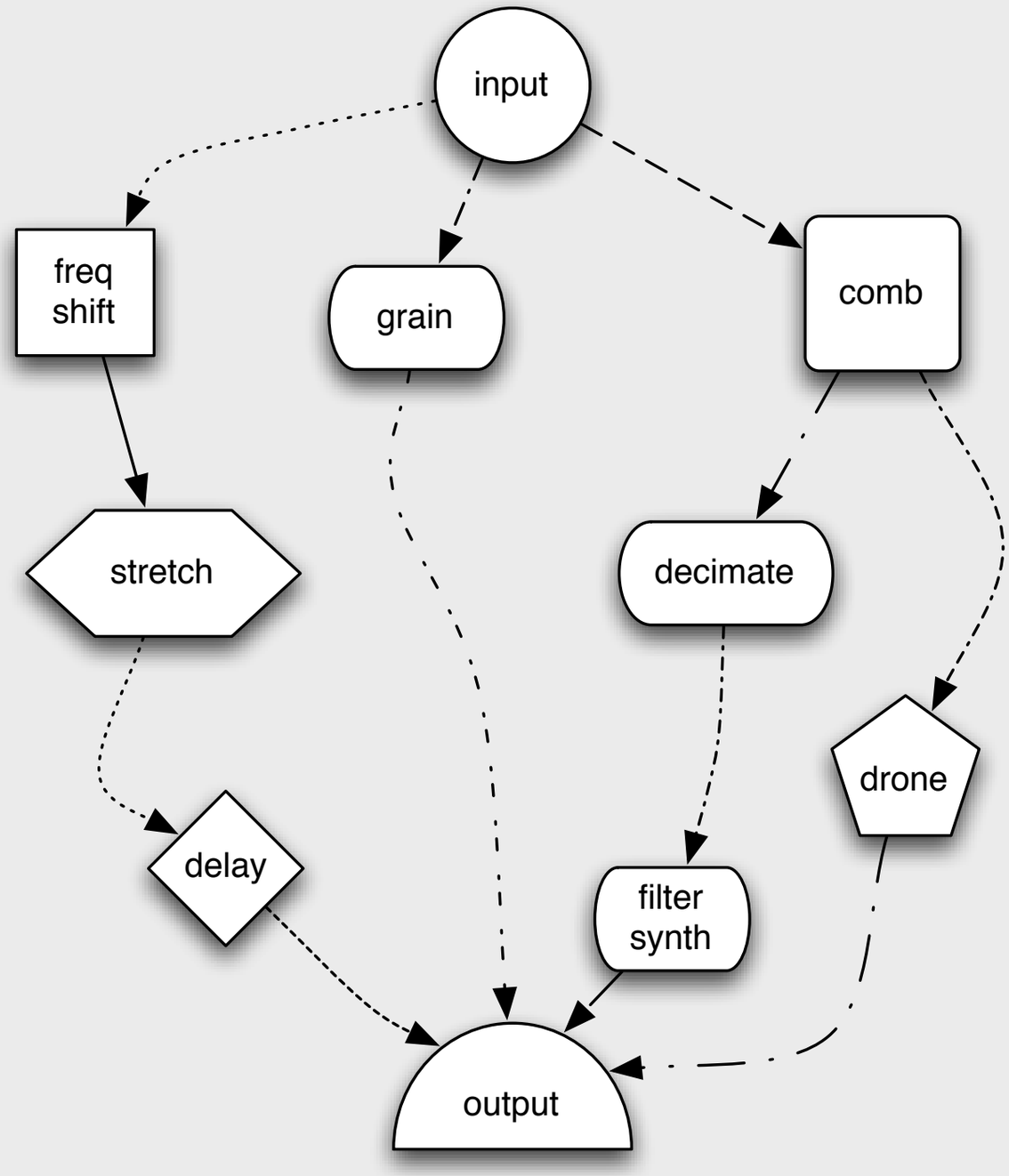
variety of performance contexts: solo / ensemble

flexible sound processing architecture / high level control

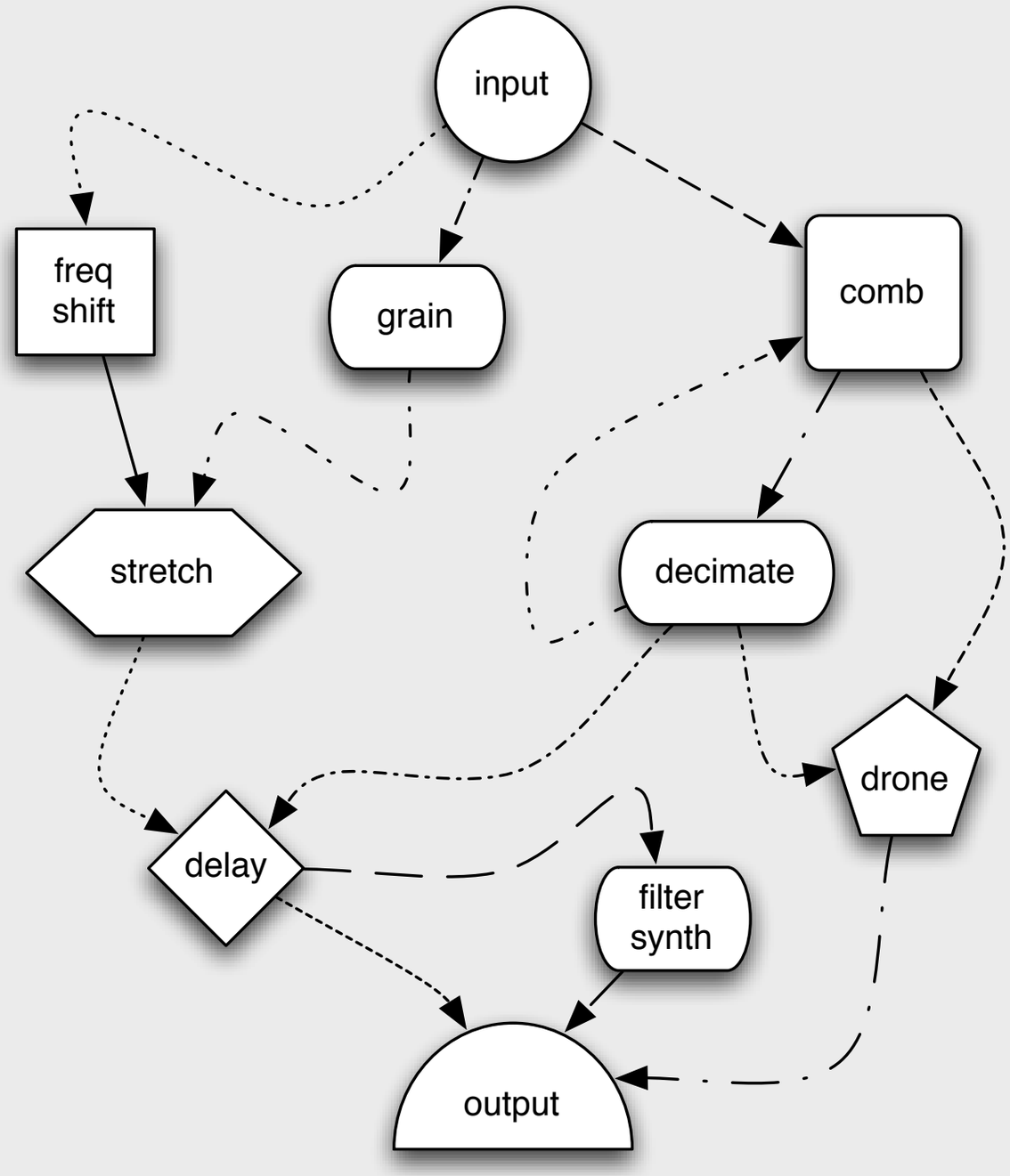
real-time audio analysis / machine listening

balance sonic richness with tactile playability

Pliability: Signal Routing / Mixing



Signal Routing / Mixing



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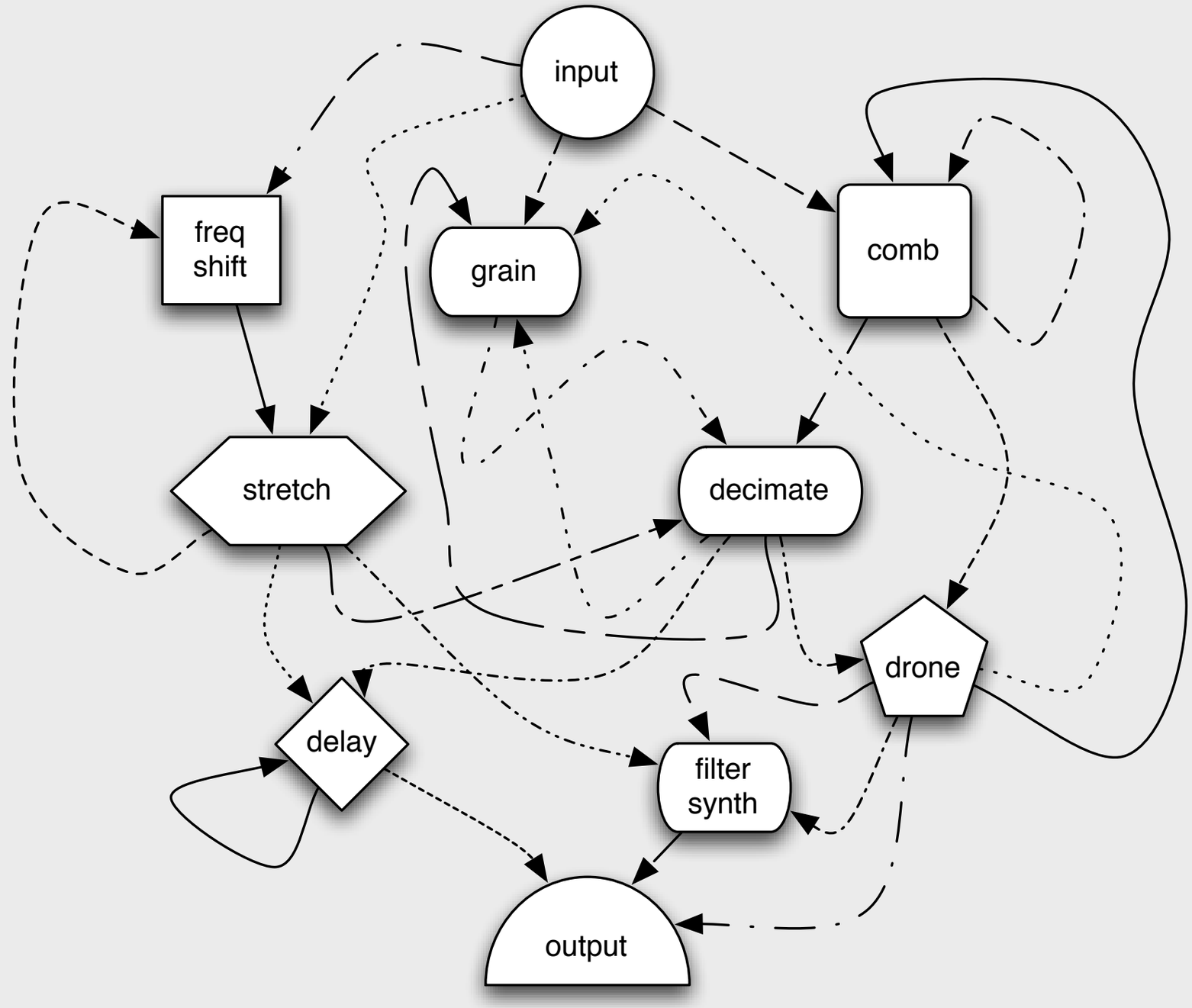
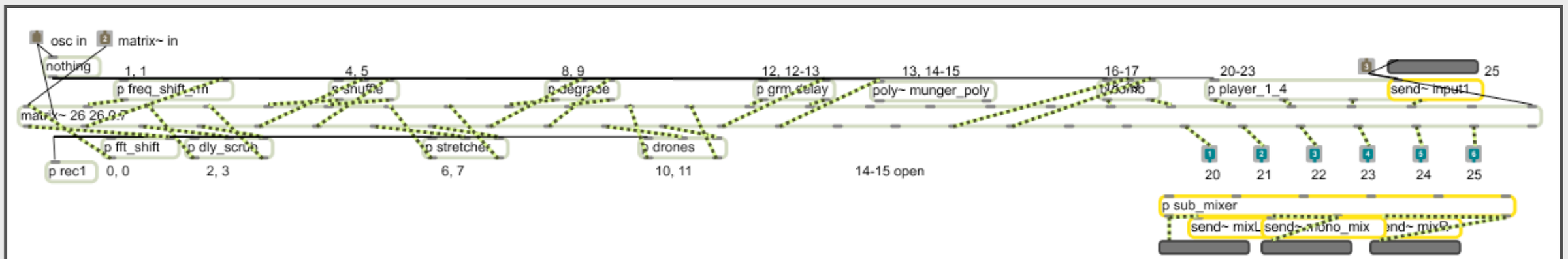


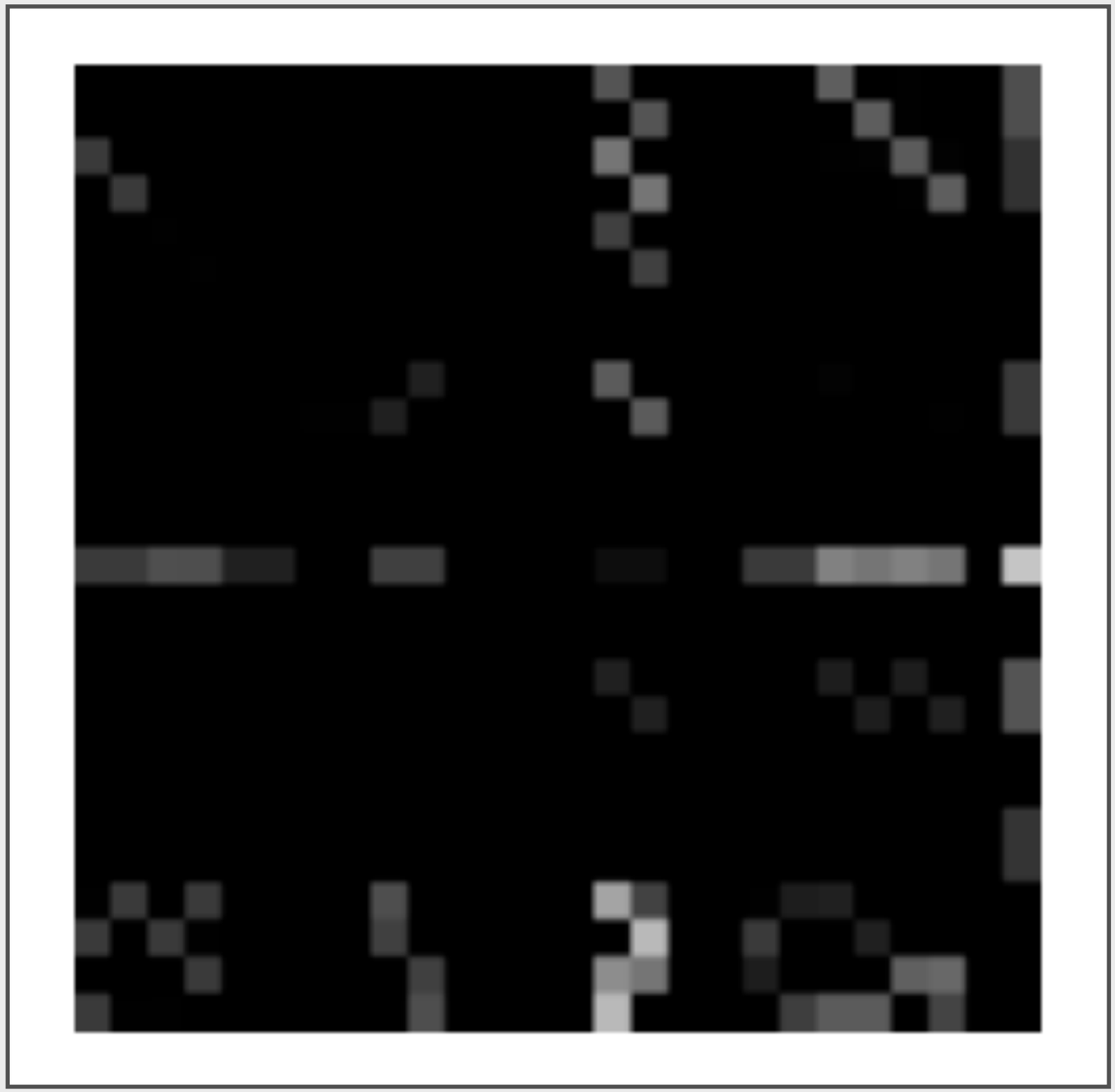
Signal Routing / Mixing



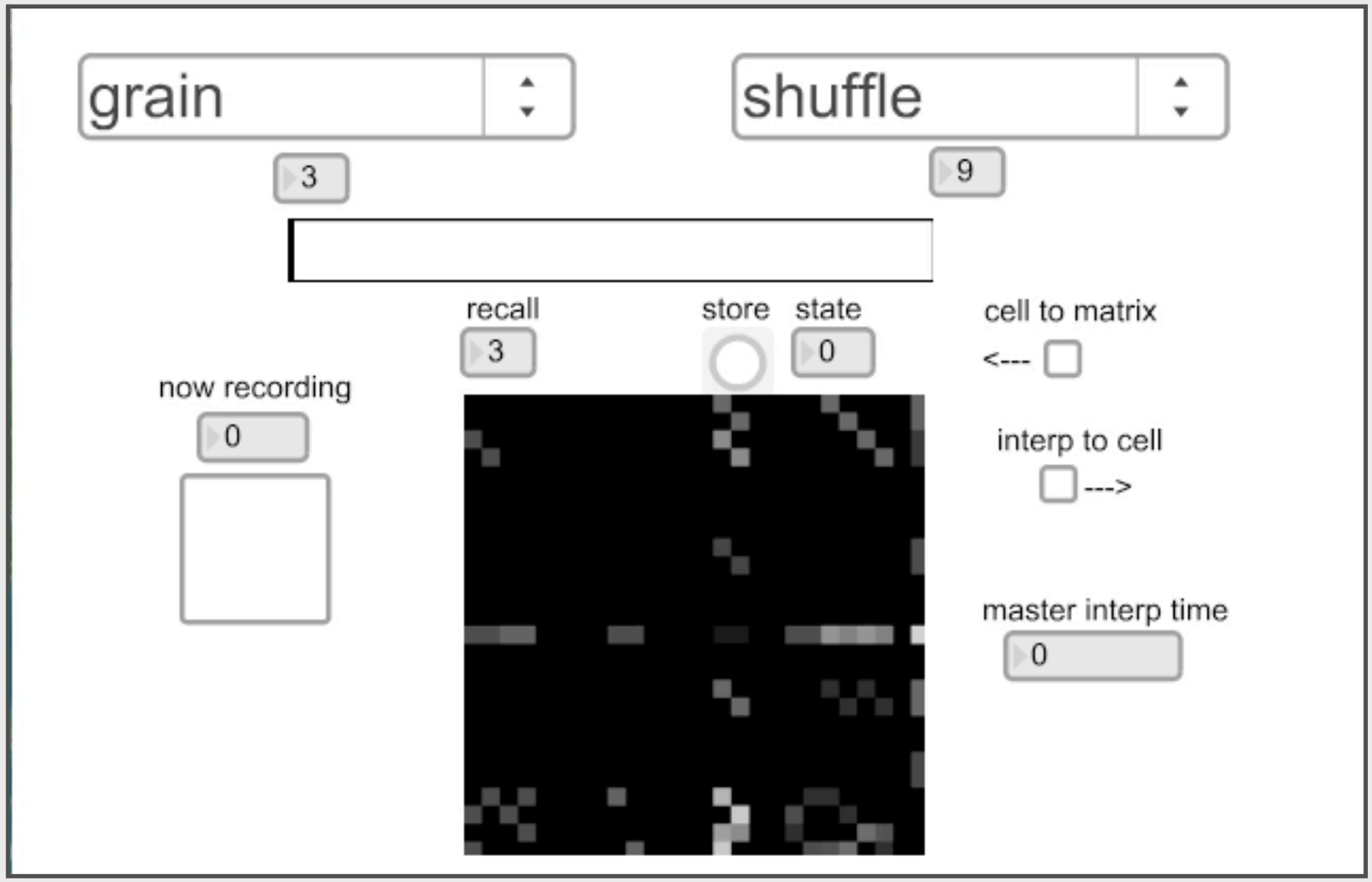
Signal Routing / Mixing

	shft	shft	dly	dly	L shuf R	sr1	sr2	dgrd	clp	drn1	drn2	L g-dly R	L gran R				L comb R		pl1	pl2	pl3	pl4		IN	
shft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.2	shft
shft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.2	shft
dly	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1	dly
dly	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	dly
L shuf R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	L shuf R
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
sr1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	sr1
sr2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	sr2
dgrd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	dgrd
clp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	clp
drn1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	drn1
drn2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	drn2
g-dly	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	g-dly
gran	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.4	0.4	0.4	0.0	0.7	gran
L comb R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	L comb R
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2			
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
dac 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	dac 1
dac 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	dac 2
dac 3	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	dac 3
dac 4	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	dac 4
dac 5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	dac 5
dac 6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.0	0.2	0.0	0.0	dac 6
	shft	shft	dly	dly	L shuf R	sr1	sr2	dgrd	clp	drn1	drn2	L g-dly R	L gran R				L comb R		pl1	pl2	pl3	pl4		IN	

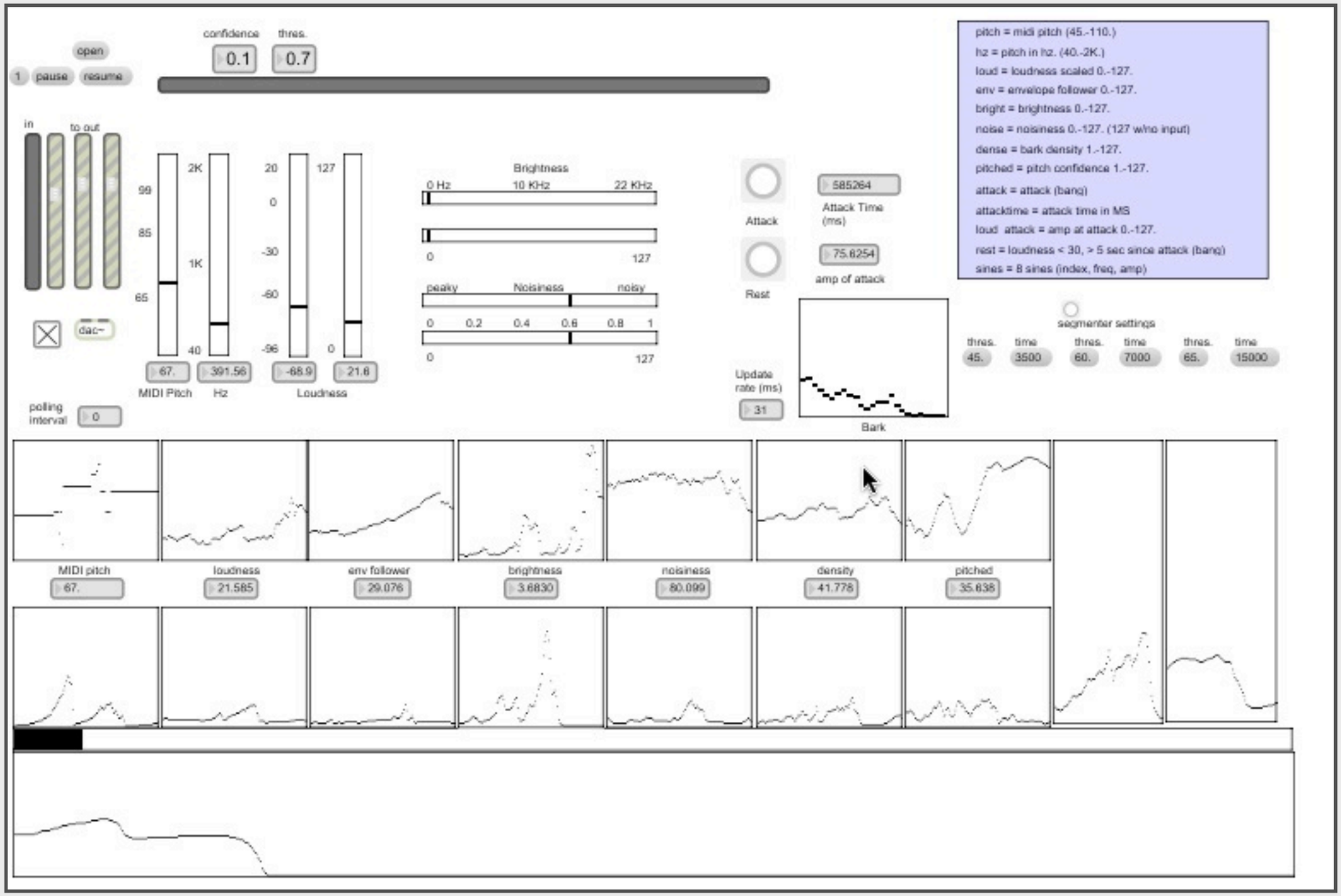
Metalevel Control



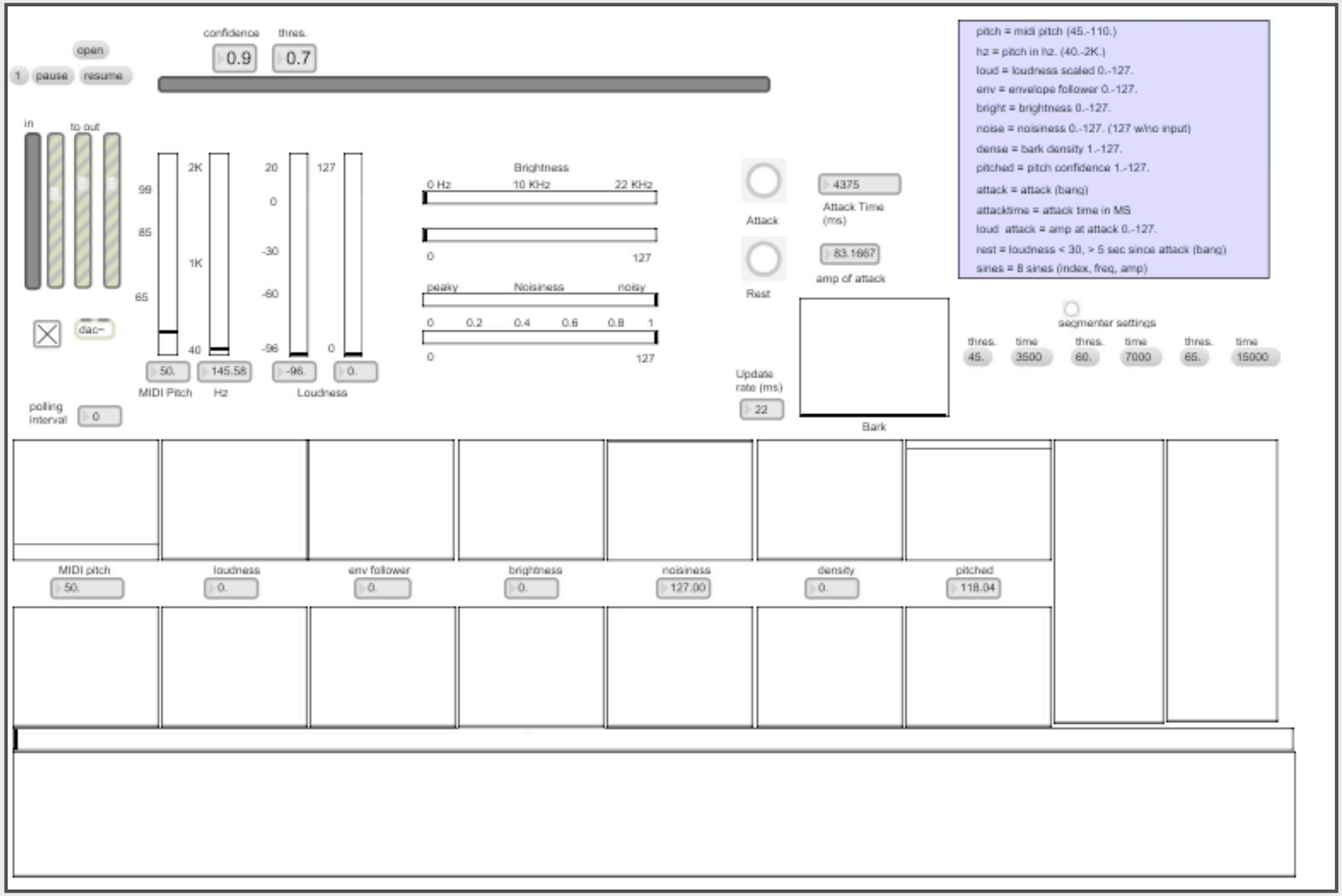
Metalevel Control



Context Awareness - Audio Analysis



Audio Analysis / Machine Listening



Beginner's Mind

Eighth Nerve Guitar

Hybrid Design - Eighth Nerve Guitar

instrument specific gestural controls +
pedals and iPad - primarily metalevel

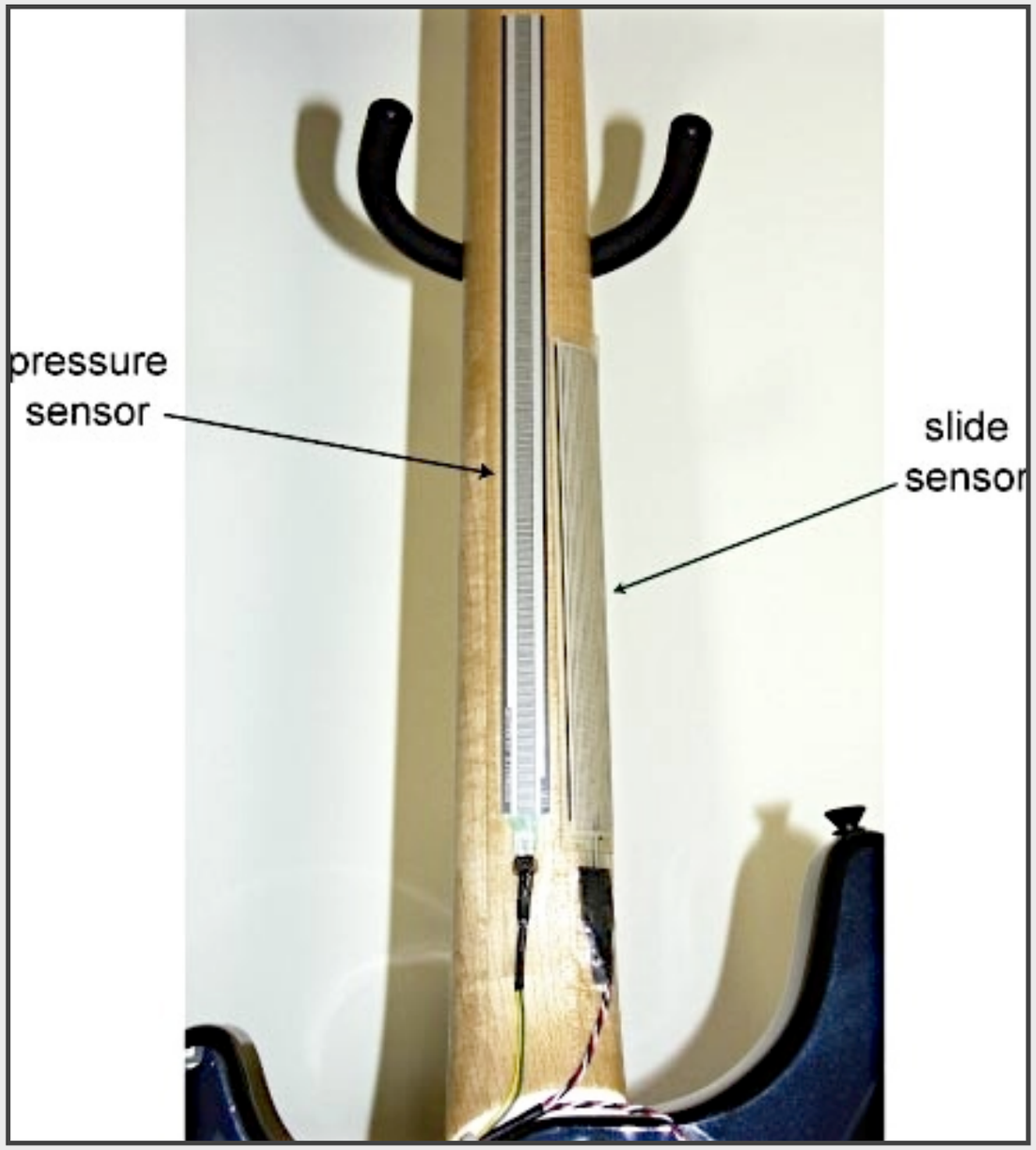
context awareness / audio analysis

analysis informed autonomous behaviors

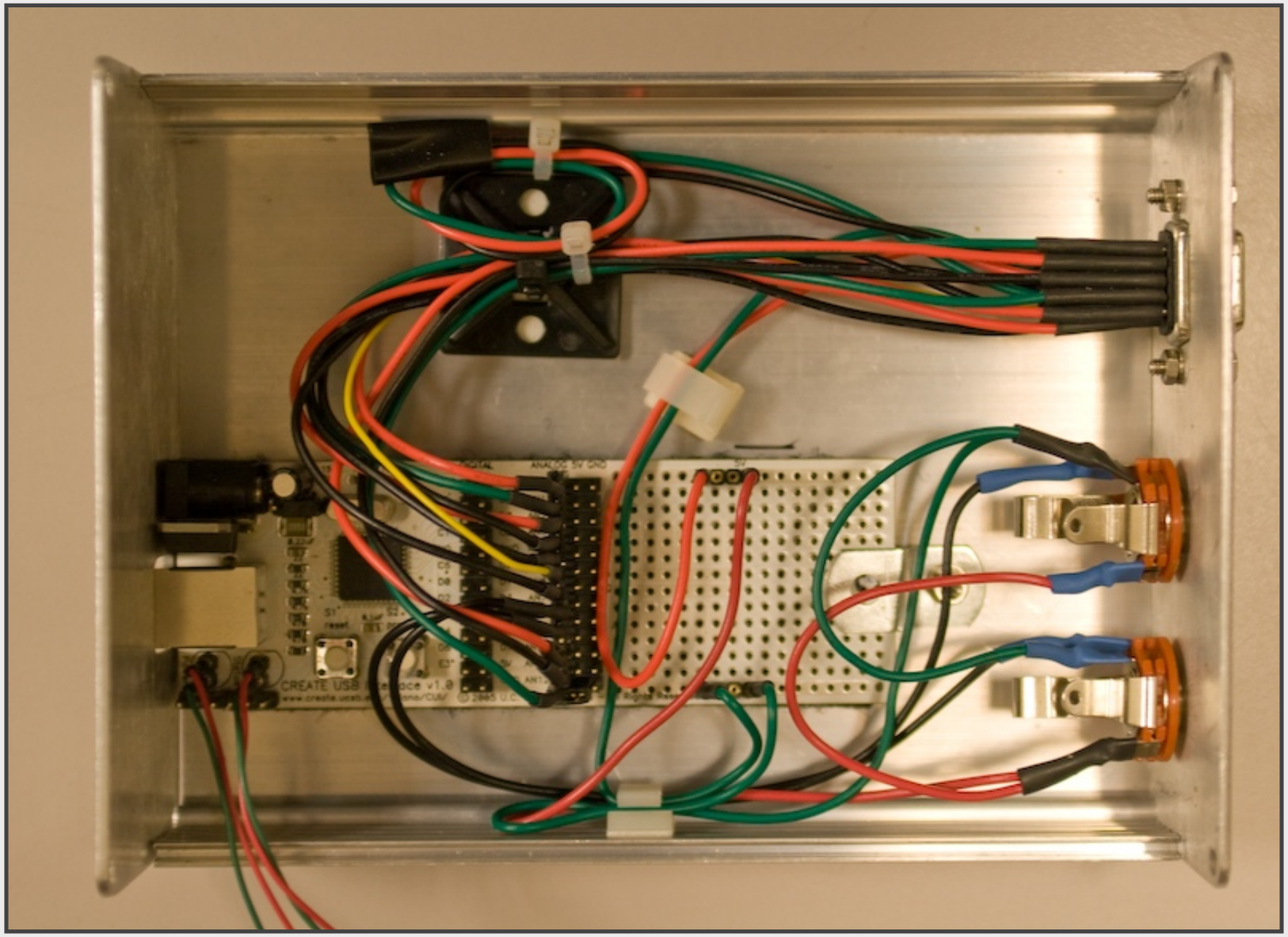
memory system

Composed Instrument - Eighth Nerve Guitar

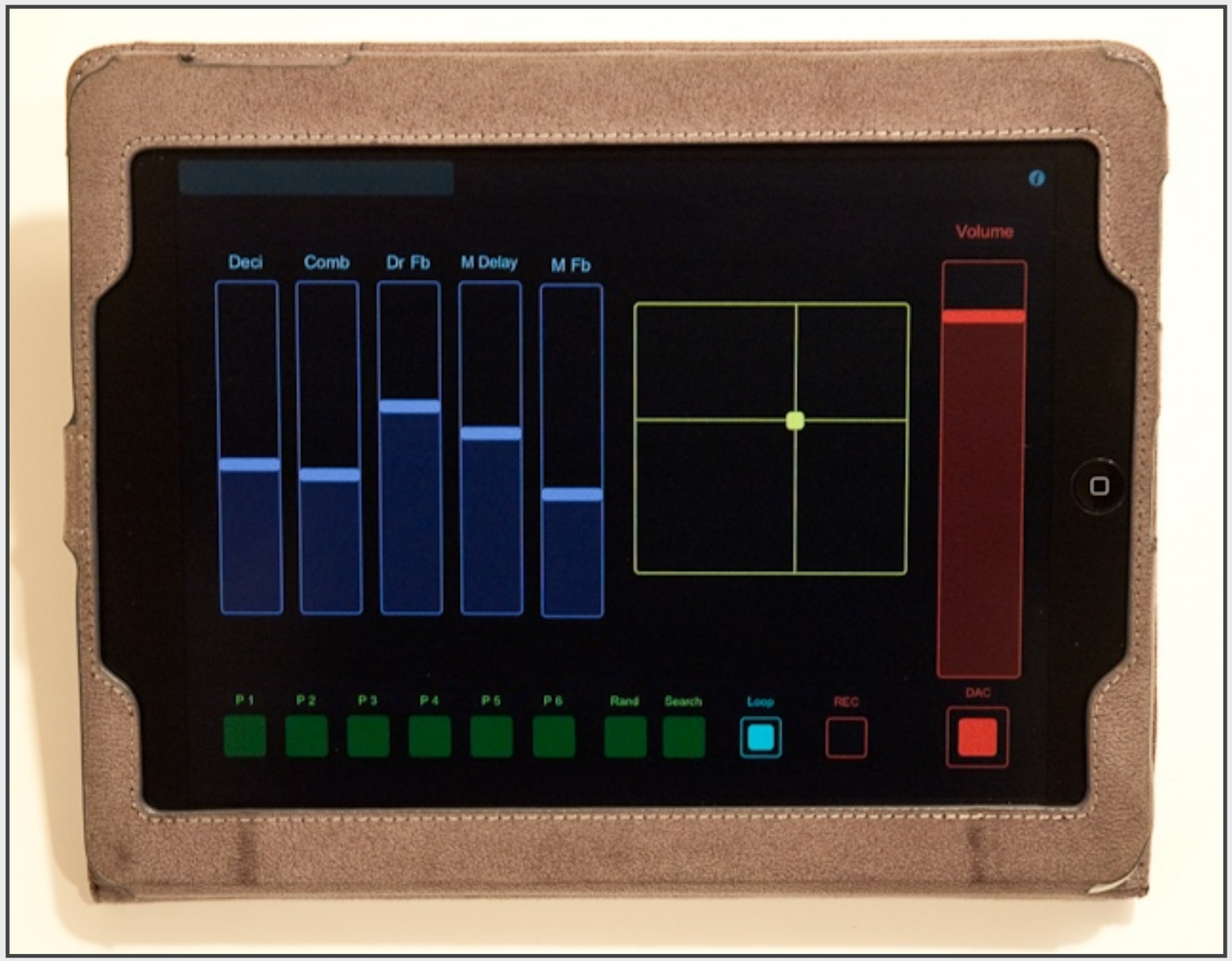
Composed Instrument - Eighth Nerve Guitar



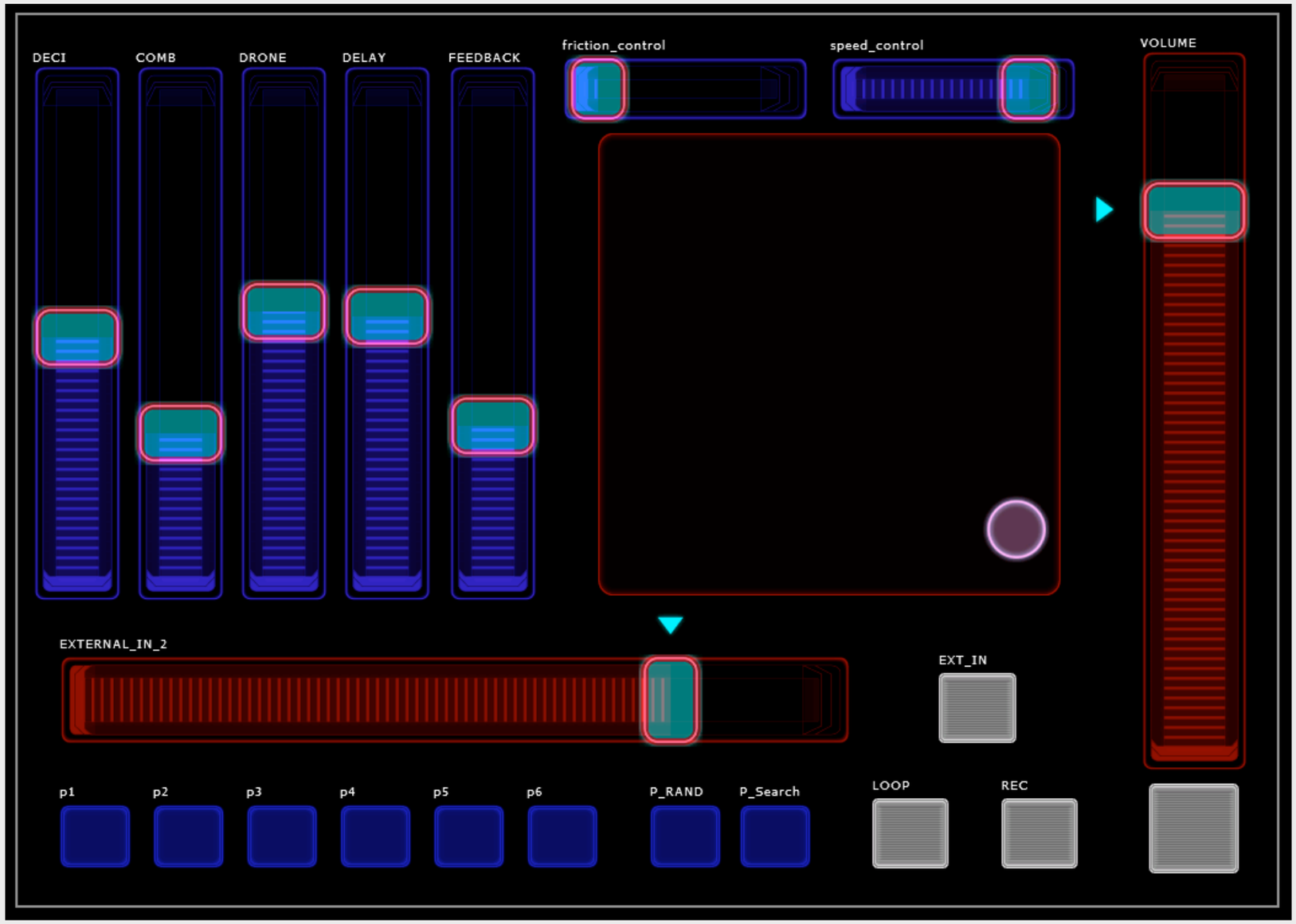
Composed Instrument - Eighth Nerve Guitar



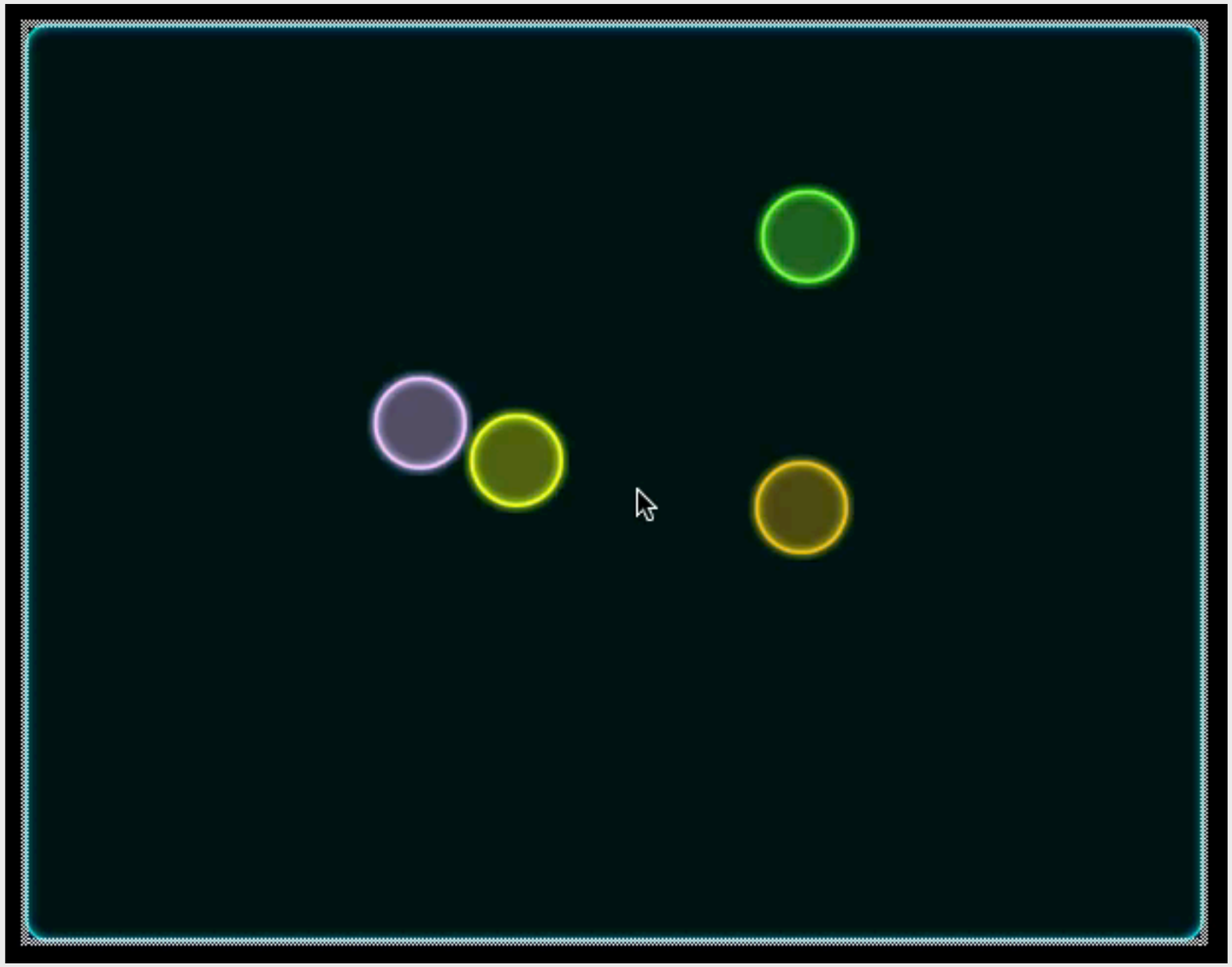
Composed Instrument - Eighth Nerve Guitar



Composed Instrument - Eighth Nerve Guitar



Composed Instrument - Eighth Nerve Guitar



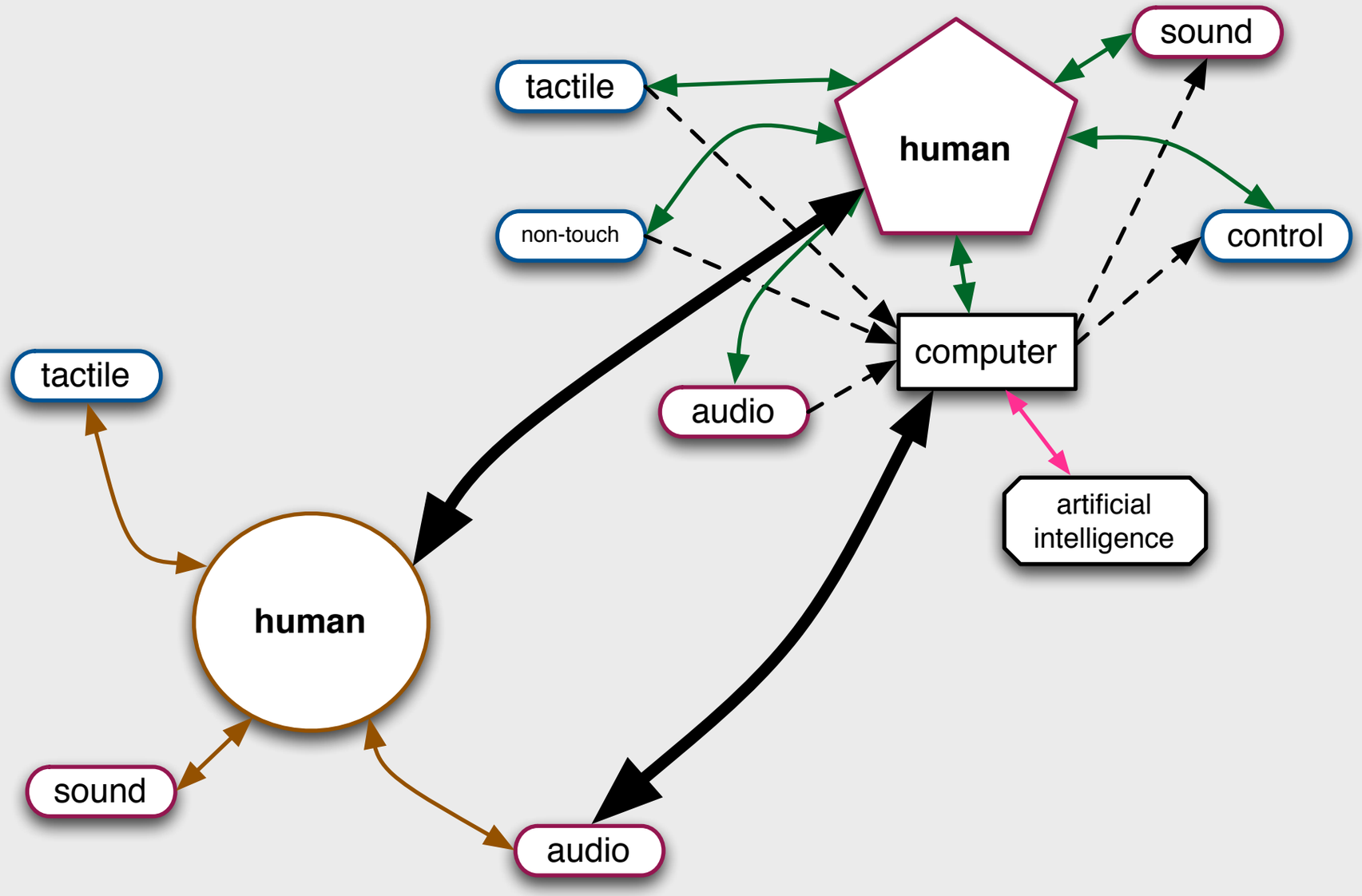
Composed Instrument - Eighth Nerve Guitar

Silent Movies

Second Dialogue

Ciufo / Ballou

Duo / Shared Mediation



Ciufo / Ballou

Mediated-Performance: Challenges....

combining the responsibilities of instrument maker / composer / improvisor poses unique demands

systems are difficult to maintain

not easy to play

reconfigurable can mean ever changing

no one to blame but ourselves...

Benefits / Possibilities

real-time access to a complex and malleable sound pallet

combine compositional structures, navigable spaces, and spontaneous invention during performance

design instruments / systems that reflect a unique musical aesthetic or approach to performance

redefine / reenvision improvisational practice

Second Dialogue

Thanks!

Thomas Ciufo
www.ciufo.org