Searching for Gesture and Embodiment in Live Coding

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Overview

Tension between live coding, gesture, embodiment, and electronic music production

Historical approaches to addressing this tension

Reshaping of source code media

A continuation of these ideas: Auraglyph
Live coding, Gesture, and Embodiment

At first glance, live coding and gesture seem at odds

Levels of indirection
Continuous control

Physical and visual dimensions of music performance
Performer / Audience
Gesture

“bridge between movement and meaning”
(presumably, that of a musical nature)

Jensenius et al.,
“Musical Gestures: Concepts and Methods in Research,”
in *Musical Gestures: Sound, Movement, and Meaning*. 
Gesture

Most attempts to define gesture admit keyboard activities.
Many definitions admit activities not visible to an audience.
(Aside)

The notion of gesture in musical performance most likely needs reconsideration in the context of live coding

(But not right now)
Embodiment

“[I]ndividual sensorimotor capacities [...] embedded in a more encompassing biological, psychological and cultural context.”

Tensions

Pursuit of “more humanly active live coding”

Tensions

“A live coder [...] is under pressure to do something interesting in the moment”

“[Abstraction and scheduling] can lead to a lack of immediacy in how the performer’s actions relate to the music”

Stowell and McLean 2013,
“Live music-making: a rich open task requires a rich open interface,”
*Music and Human-Computer Interaction.*
Tensions

Embodiment in live coding surfaces in...

“the physical interaction of our body [...] with the machine”

“how [...] a programming language shapes our thinking about concepts and algorithms”
(and the programming language is shaped by available hardware and end goals)

Assumptions/Oversights

Assumption:
We care about musical gesture in live coding

Not considering:
Embodiment of audience
(e.g. dance)
Tensions

Typing gestures not linked directly to music

Rather, linked to production of a set of instructions for producing music
Argument
Existing mechanisms for imparting gesture and embodiment in live coding are unsatisfactory

Proposal
Consider extensions to plain text as the universal medium for programming code
Prelude: ChucK on iPad

Salazar and Wang 2014, “miniAudicle for iPad: Touchscreen-based music software programming,” *Proc. ICMC*
Gestural Dynamics of Mobile Touch Devices
Gestural Dynamics of Mobile Touch Devices

(Not so good for entering text)

(We’ll get back to that)
Algorithm and Gesture

Algorithmic processes constrained by what is readily formulated and encoded

Gestural processes constrained by what is readily carried out by a body in the physical world
Algorithm and Gesture

Intent → Code → Audible Result
Algorithm and Gesture
Algorithm and Gesture

Intent → Algorithm → Code → Audible Result → Algorithm → Intent
Algorithm and *Gesture*

- Intent
- Gesture
- Audible Result
Algorithm and **Gesture**

Intent → Embodied Cognition → Gesture → Audible Result
Algorithm and Gesture

(Ok but what if algorithm is the intent?)
Text as Abstraction

Code exists in many forms

Programmer’s intent

High/low-level languages

Abstract syntax trees and intermediate representations

(Virtual) Machine code
Alternative Abstractions

Dataflow programming
PureData, Max/MSP, Reaktor, Kyma, TouchDesigner, etc.

Scratch, TouchDevelop
(Resnick et al. 2009, Tillmann et al. 2011)

Lisping

Field
(OpenEnded Group)

Processing (tweak mode)
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Sketching Live Code

Auraglyph is a modular music patching system with sketching metaphor

Hand-drawn figures -> reified into programming nodes

Touch and drawn figures also used for control

Salazar 2017, Sketching Sound: Gestural Interaction in Expressive Music Programming
Auraglyph

Goal
“physical” connection to sound processes
Gestural Support

Scrubbing parameters

Writing parameters directly

Organizing/patching

Step sequencer, waveform editor, orientation sensor, pen x/y/pressure
(secondary to coding activities)
Gestural Support

Multiple simultaneous gestures (multiple performers)

Physical dexterity

Dynamic, real-time feedback
Gestural Support

Sense of 3D space

Performer’s activities are fairly transparent to audience (if projected)

Visual interest for audience
Auraglyph in Practice

How has this played out?
PULSE (2016)

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2016
Electronic Arts Ensemble (2017)
A sonic ritual for Auraglyph (2017)
Looking Forward

Live coding beyond the laptop

Merging layers of abstraction:
Text, graphical, dataflow, timeline, ?
Conclusion

Tension between live coding, gesture, and embodiment
Many paths for addressing this tension
Auraglyph: sketch-based dataflow live coding
In the future?
Thanks!

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Questions?