

Configurin(g) KaiBorg: Interactivity, ideology, and agency in electro-acoustic improvised music

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Abstract: Drawing on our experiences as electro-acoustic improvisers in the duo KaiBorg (<http://kaiborg.com>) and on emerging theory in the social studies of technology and neocybernetics, this paper interrogates the ideologies that underpin notions of interaction and interactivity and it theorizes a notion of agency of a far more complex variety than that of traditional humanism. We suggest configurin(g) as a useful theoretical orientation in which users, technologies, and environments mutually constitute one another via strange loops of perturbation/compensation.

The discourse surrounding improvised music performance often foregrounds the notion of *interaction*. Performers relate their expressive behaviors to one another in real time and they both affect and are affected by the mood and response of their audience. Interaction, here, implies that the actions of two or more individuals are observed to be mutually interdependent.

The related term *interactivity* is often bandied about as one of the most important aspects of “new” media that distinguishes it from “old” media. Interactivity, here, is used to describe the measure of a medium’s potential ability to let the user exert an influence on the content or form of the mediated communication in real time.

But the notions of *interaction* and *interactivity* subsume—often in rather vague ways—an enormous variety of embodied, interpersonal, and human-computer dynamics. In the discourse surrounding improvised music, for instance, the term *interaction* still often brings to mind metaphors of conversation, vocabulary and other aspects of language that, while perhaps well-suited to analyzing more conventional forms of jazz improvisation, are often ill-suited to describe more contemporary performance practices. And in electro-acoustic forms of musical improvisation, the term *interactivity* is often treated as a quality that is designed into a system *a priori*. But, as Mark Hansen argues, “worldly (environmental) complexity has become so intense and so messy [that]...we cannot ignore the agency that is wielded by the environment” [1].

Based on our experiences as electro-acoustic improvisers and as researchers into questions surrounding music and the culture of technology, we suggest *configurin(g)* as a more apt theoretical orientation. *Configuring*, in its colloquial usage, often refers to the need for individuals to “set-up” their own technological environment. But technologies also configure us, affording particular kinds of behavior patterns (and potentially obscuring other “fields of experience” or “constellations of knowledge,” à la Heidegger) [2]. Configuration, as the term

has been used in recent decades in actor network theory (ANT), an outgrowth of the social studies of technology, suggests a *mutually constitutive* process through which users, technologies, and environments are dynamically engaged in refashioning one another in a feedback loop [3].

In our usage, *configurin(g)* is also meant to reference the work of Henry Louis Gates, Jr. on *signifyin(g)*, the term most often used to describe the semantic play commonly encountered in African American language and music. Gates differentiates his usage of signifyin(g) from the Saussurian sense of a fixed sign by emphasizing the dialogic interactiveness of performance and the mutability and ambiguity of meaning found in African American arts in general. For Gates, "One does not signify something; rather, one signifies in some way" [4]. To signify is to turn the static equation between two related "things" into a double-voiced process, to revise that which is received and alter the way the past is read, redefining one's relation to it.

Emerging from literary studies, signifyin(g) has been primarily used to understand intertextuality; the ways in which new texts enter into a dialogic engagement with preceding texts and, in the process, reshape our conception of the tradition in which these texts occur. Musical scholars have extended this approach to intermusicality, but the focus usually remains on textual relationships (i.e., compositions or recordings) [5]. *Configurin(g)* allows us to extend this theoretical orientation further into the domain of improvised music and to shed additional light on the embodied and performative aspects that define, enable and constrain our mutually constituted relationships between bodies and machines, and between sonic, material, and social space. To rephrase Gates, one does not configure something; rather, one configures and is configured in some way.

Although conversation has been a presiding metaphor in discussions about jazz improvisation, it may be more apt to think of contemporary improvisers as mutually configuring a shared sonic and behavioral space. And although the notion of interface and interactivity tends to bring to mind structures of hardware and/or software, we may be better served by envisioning the mutually configuring activities of designers, practitioners, onlookers and the "technologies" themselves.

The nature of the connection between the design, production, consumption, and use of technology is a vexing question. Perhaps the most radical theoretical move made by ANT researchers was to suggest that "knowledge" always takes material forms (whether as "artifacts" or as embodied "skills"), and that the "social" is nothing more than "patterned networks of heterogeneous materials." "This is a radical claim," writes John Law, one of the early proponents of the field, "because it says that these networks are composed not only of people, but also of machines, animals, texts, money, architectures—any material that you care to mention" [6]. According to Law, "Almost all of our interactions with other people are mediated through objects of one kind or another." We contend that this is no different for musicking interactions [7].

While the name of our electro-acoustic duo is, on the one hand, a simple contraction of our last names, it is of course meant to evoke the well-known (and well-trodden) image of a hybrid bio-machine; a cyborg. Images of cyborgs are frequently intended to incite fear, combining as they do (at least in Hollywood) flesh and metal, brain and electronics. But as Andy Clark argues, we are all "natural-born cyborgs" [8]. Our remarkably plastic brains, combined with the ways in which our embodied minds have co-evolved in tandem with a shaping environment, have

primed us to seek out and incorporate non-biological resources and their supporting cultural practices into our very existence. For Clark, the transition from notepad to notebook (computer) is one of degree, not kind.

Similarly, although in casual usage the term “music technology” is often used primarily in connection with microphones, electric instruments, synthesizers, and, most recently, digital computers, music has been connected with “technology” since at least the first flute holes were bored in bone or sticks were beaten on hollowed logs. A piano, for example, is a remarkably complicated piece of musical technology [9].

Gregory Bateson, one of the leading thinkers in early cybernetics and systems theory, was fond of highlighting the ways in which, from an information theoretical standpoint, even the boundaries of the human self are constructed rather than pre-given. He made this point with a koan-like simplicity: “Is a blind man’s cane part of him?” [10]. The question aimed to spark a mind-shift: Although it may be convenient to conceive of human boundaries as defined by their epidermal surfaces, in Bateson’s example the cane provides essential information to the man about his environment in a way that makes them, from a systems perspective, inseparable. This, again, is no different for music.

Improvisers frequently stress the intimate connections that they forge with their instruments over a lifetime of musicking. For instance, saxophonist Evan Parker comments: “In the end the saxophone has been for me a rather specialized bio-feedback instrument for studying and expanding my control over my hearing and the motor mechanics of parts of my skeletal-muscular system and their improved functioning has given me more to think about” [11].

KaiBorg, an electro-acoustic improvising duo featuring David Borgo on saxophones, various small and hybrid winds and laptop, and Jeff Kaiser on quartertone trumpet, flute, voice and laptop, takes these cybernetic feedback and feedforward processes for granted [12]. Our goal is to design and create hybrid instruments (using Max/MSP and various hardware controllers—primarily foot pedals and switches) with which we have the same intimate feedback relationship as our traditional acoustic ones. Ultimately we seek an action/response time that is comparable to that of purely acoustic improvised performance.

For our own aesthetic reasons, we avoid using pre-recorded or pre-composed musical materials of any kind so that all of the sonic events and forms originate in performance. We do not, however, shun our relationship to the rich traditions of jazz and African American creative music making; rather, we employ these real-time interactive strategies within the expanded sonic palette and space made possible by the use of live electronics.

Despite our earlier comments about the ubiquity of music technology, we should not downplay the configurational shifts afforded by music technologies since at least the advent of the microphone and amplification. At the very least, the microphone made it possible to craft a non-natural balance between musicians and to capture close-up sounds from an instrument or singer, providing a sense of intimacy to both recordings and large venue performances. Amplification also made it possible for small groups to achieve similar or greater intensity levels associated with loudness to those of much larger ensembles. Most recently, digital synthesis and signal processing affords the possibility of creating new sounds and transforming, layering, and distributing acoustic ones in new ways.

These extremes of close-mic’d intimacy and body-shaking intensity are part and parcel of KaiBorg’s aesthetic, as are strategies to disperse and denature the musical “self” [13]. We have

been exploring these possibilities as a duo since the summer of 2007, and in recent performances we have added interactive video and/or collaborated with video artists, as well as added advanced audio spatialization techniques that split and spread the frequency bands of our instrumental sounds across eight or more speakers. KaiBorg has performed in Sweden and Amsterdam (notably at the celebrated research center STEIM or Studio for Electro-Instrumental Music), as well as at the NWEAMO (Northwest Electro-Acoustic Music Organization) festival, the UC Institute for Research in the Arts "State of the Arts" Festival, the International Association for Improvised Music Conference (in Denver, CO and Santa Cruz, CA), and at the gala opening of the Conrad Prebys Music Center at UC San Diego, among other venues.

If we tentatively define electro-acoustic improvised music as real-time musicking involving humans, acoustic sound sources and spaces, and interfaces with electronics, then the practice appears to foreground (perhaps in somewhat equal measure) issues of human-human, human-machine and human-text (e.g., a computer program, or the "media message" of performance) interactivity. Each of these paradigmatic points of interaction—and the enormously complex ways in which they overlap and intersect each other—affords a site for creative engagement, and, potentially, a site for ideological conflict.

It can be challenging to differentiate aesthetic decisions from ideology and power structures. For Terry Eagleton, "[I]deology is a matter of 'discourse' rather than 'language.' It concerns the actual uses of language between particular human subjects for the production of specific effects." In other words, one cannot decide whether a statement was ideological or not by inspecting it in isolation from its discursive context. "Ideology," Eagleton reminds us, "is less a matter of the inherent linguistic properties of a pronouncement than a question of who is saying what to whom for what purposes" [14].

Perhaps the single greatest challenge to theorizing electro-acoustic musicking is realizing the extent to which the technical/non-technical dichotomy informs nearly all discourse. Simply stated, this dichotomy implies that the "technical," by definition, precludes the social. Broadly speaking, this technical/non-technical dichotomy leads to discussions that hinge on what weight should be given to technical and social factors, often leading individuals to vacillate between some form of *technological determinism*—usually viewing "technology" as the root determinant for good or evil (e.g., technophilia/utopia or technophobia/dystopia)—or *social determinism*—envisioning society and individuals as relatively autonomous and therefore the primary determinants of technological development and use. Even rather complicated combinations of these views still hinge on the technical/non-technical dichotomy (e.g., the view that social factors can impinge on the institution and practice of science, but not on the character of scientific knowledge itself).

In electro-acoustic improvisation, this dichotomy plays out in the belief that the technical and the non-technical are distinct domains of discourse and expertise. And from this distinction, we contend, ideas about interaction and interactivity always carry with them an ideological charge. To investigate ideology in electro-acoustic improvisation, therefore, one must interrogate the ways in which this dichotomy between the technical and the non-technical is used, when, by whom, and to what effect, as well as to what extent does this distinction itself perform different communities.

For instance, we can envision three paradigmatic ways to engage as a performer with electro-acoustic improvised music: one involves creating acoustic sounds, a second involves creating electronic sounds, and a third involves manipulating (e.g., through signal processing or spatialization) acoustic and/or electronic sounds. Depending on the division of labor (if you will)

within a given ensemble, each of these roles can be performed separately or in combination by any individual. Similarly, these roles could be performed separately or in combination by computerized/mechanized processes.

One of our key arguments for avoiding falling into a “conversation trap” when discussing interaction is to extend the notions of agent and agency to both human and non-human entities, all of which have the ability to influence other forms of agents or to initiate action. This broadening of the concept of agents also allows an understanding of interaction that is not necessarily communicative, but also manipulative or navigational [15].

In practice, improvising ensembles seem to either delegate the paradigmatic roles outlined above to separate agents (be they biological or electro-mechanical), or they embrace hybrid approaches and identities: i.e., having individuals take on and integrate multiple roles. Evan Parker’s Electro-Acoustic Ensemble, for example, tends towards a division of labor along paradigmatic lines (only two of the fourteen musicians in the most recent version of the group assume more than one of the paradigmatic roles outlined above). George Lewis’s *Voyager* might be interpreted similarly, although his approach teams acoustic improviser(s) with an interactive computer agent (or, perhaps better stated, agents, given Lewis’s notion of “multidominance”) that generates its own electronic sounds (or, in recent versions, triggers acoustic ones using a Disklavier) [16].

In a way, an aesthetic can be seen as reigning in the complexity of possibilities, and yet when an aesthetic becomes a conscious, or more so, unconscious, point of battle, it becomes an ideology. But what then happens to ideology when we take away humans as the sole agents of ideology? We can look at the ideology of agents in our environment. Does software have ideology? Do interfaces have an ideology? Do traditional instruments? Depending on “discursive context,” it all certainly can. As Noah Wardrip-Fruin writes, “Learning to understand the ideologies encoded in models and processes, when unacknowledged by system authors, is an important future pursuit for software studies” [17]. Lewis, among others, is well aware of the ways in which software can serve as a type of Rorschach test, revealing the researcher/creator’s cultural background and psychological disposition. He also stresses that, at its core, *Voyager* asks listeners to extend “empathy” to non-human agents [18].

Most, if not all, of the challenges inherent to successfully integrating electronics into an improvising situation, like their concomitant ideologies, hinge on notions of control and agency. Miranda and Wanderley, in *New Digital Musical Instruments: Control and Interaction Beyond the Keyboard*, define a digital musical instrument (DMI) as one in which there is an arbitrary mapping between control information generated by a gestural controller and the parameters of a sound production unit [19]. This arbitrariness of gestural control would seem to place DMIs in a qualitatively different category than other instruments (although the pipe organ comprises an arbitrary control relationship as well). At the very least, DMIs present a creative challenge to performers that must be considered. Without an invariant action-sound coupling, performers must establish provisional action-sound relationships [20].

In this way, our decision to move towards simpler hardware (button and pedal based) can be seen as more than just an aesthetic choice, but one that is a conscious movement away from the distractions of technophilia and the frequently unexamined ideological drive towards “the new.” This ideology of the new, while highlighting the value of research and change, also has a down side: performers spend their time negotiating new “interface” environments, as opposed to developing knowledge, connection, and intuition within a more familiar one.

Since DMIs (and electronics more generally) do not necessarily display direct evidence of their sonic actions during performance, listeners also need to reconsider their relationship to the performance event and the resulting sounds. For instance, those listeners most accustomed to jazz and acoustic forms of improvising can find that electro-acoustic approaches do not readily meet modernist expectations about the “heroic soloist.” Listening to electronics also challenges, often in provocative ways, our basic abilities/desires to seek the identity and communicative purpose of performers. There is no reason to think, however, that provisional action-sound couplings (or intentional de-couplings) cannot be effectively perceived during performance.

What may be most important, however, about these issues of interface and engagement are the ways in which some degree of agency (and therefore ideology) must be granted to the “technologies” and to the technologically-mediated “environments” themselves. David Rokeby, designer of the *Very Nervous System*, writes compellingly (if somewhat fearfully) about the ways in which interactive technologies and media “filter” our engagements with a hypercomplex world, and, in the process, alter our modes of action/perception. For Rokeby, these filters operate like a “belief system,” filtering out apparent irrelevancies and giving us simplified representations of our relationships that make it easier for us to make decisions [21].

Like Rokeby, we wish to interrogate the ideologies that underpin notions of interaction and interactivity, but we also wish to theorize agency of a far more complex variety than that of traditional humanism. As long as we maintain an anthropocentric view, we are doomed to vacillate (as Rokeby often does) between the poles of *humanist pessimism*—the machine as dehumanizing—and *humanist optimism*—the machine as expanding what it means to be human, extending our biological, intellectual, and communicative capacities. In both cases, giving the ill-defined notion of “the human” center stage prohibits more nuanced theorizing about systems of communication and ultimately keeps us mired in a dialectics of matter and form, of substance and pattern, in which the immaterial wrests agency away from the embodied.

To be clear, we do not wish to argue here for a facile “post-humanism” that reproduces and vilifies a unified human subject as its “other.” We are still interested in (following again Clark’s “natural born cyborgs”) material brains, material bodies, and the complex cultural and technological environments whose looping interactions generate human thought and reason. But we contend that by describing society on the basis of its *events* rather than its *members*, we can circumvent the vexing question of where exactly resides “the human”: in its biological, psychic, or social identity?

Recent theorizing in neocybernetics (a.k.a. second-order systems theory), along with ANT, may afford us a means by which to reconceptualize human agency as technically distributed agency. Neocybernetics emerged out of the work of Maturana and Varela on biological autopoiesis and Niklas Luhmann on social systems theory, and it involves a radical shift from a representationalist to a constructivist epistemology and ontology. A rallying cry of sorts for neocyberneticians is the notion of “openness-from-closure.” Briefly, researchers with this orientation are interested in forms of emergence that happen “by way of system-specific and system-internal reductions of hypercomplexity to ordered complexity” [22]. In the language of neocybernetics, systems are *structurally coupled* together, but their openness stems from their *operational closure*; their interactions involve *perturbation/compensation* relationships rather than direct influence.

Music (along with language) may be one of the primary cultural mediums of structural coupling between systems of life, consciousness and communication. The current thinking in biomusicology, for instance, argues that musicking for our ancestors may have enhanced

cooperative survival, promoted group identity and collective thinking, and allowed an avenue for resolving intergroup conflict. Musicking is also an essential part of the infant-caregiver relationship, such that musicking with small children establishes a form of mutual coupling and an intentional framework that may allow for subsequent language acquisition and for the development of a theory of mind [23].

Music, as we have argued here, has also had, and may increasingly have, an intimate relationship with systems of technology. It has developed from, and taken advantage of, our natural proclivity for tool-based extension and technical/cognitive scaffolding. Although it is still common to speak of “configuring” technologies and interfaces with a focus on “input/output” relationships (all with the usually unspoken backdrop of “man the toolmaker”), we see the process of configurin(g) as one in which various systems—biological, technological, psychic, and communicative, among others—are involved in perturbation/compensation relationships. Music’s inherent polysemy would seem to support this contention that its “effect” on our bodies, minds, societies, and communications is never simple or direct.

For us, both individually and collectively, the configurin(g) process involves strange loops of perturbation/compensation in which envisioning, designing, testing, discussing, refining, exploiting and at times abandoning interfaces, and playing in/with spaces and with/for other people, is inextricably linked to (albeit not in linear or predictable ways) the types of sounds, behaviors, interactions, expectations, insights and at times disappointments that we experience as improvising musicians. Functioning as KaiBorg, we envision ourselves not as some bizarre organism combining flesh with machine, the artificial with the natural; rather, following Mark Hansen, we see ourselves as system-environment hybrids—human beings correlated with culturally and technologically catalyzed interactional possibilities [24].

It may become increasingly difficult to maintain the conventional binary between humans and their technological environment (i.e., between “what we make” and “who we (think we) are”). Moving us farther from Rokeby’s trepidations, Hansen argues that machines may in fact be “integral to any effort to impose some provisional closure, some fleeting reduction of complexity, on a world, a technosphere, increasingly characterized by relentless heterogenesis.” Machines, for Hansen, are “mediators of human co-evolution with the environment” [25]. If this is to (continue to) play out in the realm of musicking, then electro-acoustic improvisation may be a powerful and provocative inroad.

References and Notes

1. Bruce Clarke and Mark B. N. Hansen, eds., *Emergence and Embodiment: New Essays on Second-Order Systems Theory* (Durham, NC: Duke University Press, 2009) p. 114. If the notion of environmental agency somehow sounds outrageous, consider the rather basic example of “thinking via the act of writing,” or, perhaps better stated for improvisers, “thinking via the act of playing (one’s instrument).”
2. Martin Heidegger, “The Question Concerning Technology,” In *Martin Heidegger: Basic Writings*, ed. David Krell (New York: Harper and Row, 1977) p. 288.
3. See Steve Woolgar, “Configuring the User: The Case of Usability Trials” in John Law, ed., *A Sociology of Monsters: Essays on Power, Technology, and Domination* (London, New York: Routledge, 1991).
4. Henry Louis Gates, Jr., *The Signifying Monkey: A Theory of African American Literary Criticism* (New York: Oxford University Press, 1988) p. 54.
5. See Ingrid Monson, *Saying Something: Jazz Improvisation and Interaction* (Chicago: University of Chicago Press, 1996).

6. John Law, "Notes on the Theory of the Actor-Network: Ordering, Strategy, and Heterogeneity," *Systems Practice* 5, No. 4 (1992) p. 381.
7. Lovemaking and *a capella* singing may be exceptions.
8. Andy Clark, *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence* (New York: Oxford University Press, 2003).
9. Computer science pioneer and occasional professional jazz guitarist Alan Kay once humorously described technology as "anything that was invented after you were born."
10. Gregory Bateson, *Steps to an Ecology of Mind* (San Francisco: Chandler Publishing Co., 1972).
11. Evan Parker, "Man & Machine 1992: 'De Motu' for Bushi Niebergall." <http://www.shef.ac.uk/misc/rec/ps/efi/fulltext/demotu.html>.
12. See <http://www.kaiborg.com>
13. See KaiBorg, *Harvesting Metadata* (pfMENTUM CD058).
14. Terry Eagleton, *Ideology: An Introduction* (New York: Verso, 2007) p. 9.
15. See Lisbeth Klastrup, "Paradigms of Interaction: Conceptions and Misconceptions of the Field Today." *Dichtung-Digital* 30 (2003).
16. George Lewis, "Too Many Notes: Computers, Complexity and Culture in Voyager." *Leonardo Music Journal* 10 (2000) pp. 33–39.
17. Noah Wardrip-Fruin, *Expressive Processing: Digital Fictions, Computer Games, and Software Studies* (Cambridge: The MIT Press, 2009) p. 423. The basic language of computer use is, of course, replete with military and masculine metaphors of control—enter, escape, command, target, master, slave, etc. And the metaphors we use to describe computer functioning—for instance, machine "intelligence," "memory," or "languages"—often obscure the ways in which these terms are full of rich, subtle, and not always well understood meanings in the human realm.
18. Personal communication, Dec. 5, 2009.
19. Eduardo R. Miranda and Marcelo M. Wanderley, *New Digital Musical Instruments: Control and Interaction Beyond the Keyboard* (Middleton, CT: A-R Editions, 2006).
20. See Alexander Refsum Jensenius, "Action-Sound: Developing Methods and Tools to Study Music-Related Body Movement." Ph.D. diss., University of Oslo (2008). Available at <http://www.arj.no/research/phd/>. Of course many contemporary ("extended") techniques on conventional instruments often seem to defy already-known action-sound couplings, and much that is involved with the performance of conventional instruments is hidden to audiences and/or performers (e.g., contortions of the larynx, etc.).
21. David Rokeby, "Transforming Mirrors: Subjectivity and Control in Interactive Media," In Simon Penny, ed., *Critical Issues in Electronic Media* (Albany, NY: State University of New York Press, 1995). Available at <http://homepage.mac.com/davidrokeby/mirrors.html>.
22. Clarke and Hansen [1] p. 13.
23. See *Cognition* 100 (2006), *Music Perception* 24/1 (2006), and *The World of Music* 48/2 (2007).
24. Mark B. N. Hansen, "System Environment Hybrids," in [1] pp. 123-4.
25. *Ibid.*, p. 125.