

Setting live coding performance in wider historical contexts

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TITLE PAGE

⇒ Setting Live Coding Performance in Wider Historical Contexts ⇒

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Abstract

This paper sets live coding in the wider context of performing arts, construed as the poetic modelling and projection of liveness. Concepts of liveness are multiple, evolving, and scale-dependent: entities considered live from different cultural perspectives range from individual organisms and social groupings to entire ecosystems, and consequently reflect diverse temporal and spatial orders. Concepts of liveness moreover evolve with our tools, which generate and reveal new senses and places of vitality. This instability complexifies the crafting of live events as artistic material: overriding habitual frames and scales of reference is a challenge when handling infinitely scalable computational phenomena.

With its generative affordances, improvised interactive programming, and notational possibilities, live coding introduces unique qualities into the performance arena. At the same time, performance history abounds in adaptive systems which anticipate certain live coding criteria. Historic performance and contemporary coding practices raise shared questions that can enhance our understanding of live art, notably to do with feedback, fixed versus on-the-fly programmable conceptual and physical frameworks, and inscriptive practices and notation methods for live action. I attempt to address such questions by setting live coding in a wider performance history perspective.

Keywords

Scale- and cultural dependencies; construals and contexts of feedback; performance apparatuses; critical practice

Introduction and context

For thousands of years, humans have been devising environments with controllable parameters to observe and manipulate live phenomena. Containment systems to secure these activities include scientific apparatus designed to provide material evidence of dynamic occurrences, and cultural apparatus designed to frame live actions as more or less ritualised events.¹ Ways we construe liveness are multiple, evolving, and scale-dependent: entities considered live from different cultural perspectives range from individual organisms and broader social groupings to entire ecosystems, and reflect diverse temporal and spatial orders. Concepts of liveness evolve with our tools, like those currently shaping synthetic and hybridised materials in technobiological engineering, or large-scale behavioural patterns in massive multi-agent networks. Such tools generate and reveal new senses and places of vitality. This instability complexifies the crafting of live events as artistic material, a task which involves overriding habitual frames of reference including conventional temporal and spatial notions of scale.

The staging of human action as cultural experience underpins many kinds of artefacts - human-made landscapes, architecture, machines - built to enhance celebrations of religious and/ or political power, community enjoyment of music, dance, and hybrid live art forms. The resultant environments highlight and delimit the live action they contain, which in turn challenges these limits in a dynamic process where physical envelopes are hard to dissociate from their co-evolving contents. Different types of concrete infrastructure have inherent technical agency: spatial and temporal behaviours of materials determine their individual and combined affordances within larger assemblages. Setting live coding in performance history means reading characteristics live coding claims as distinctive - for example, feedback, runtime interventions, phasing and concurrency, free re-programmability - against broader performance characteristics including physical infrastructure, scale, means for separating contents from containers, and status and influence of observers/ participants on live action.

Recent decades of performance abound in digital experiments indebted to pioneers like Laban, Marey and Muybridge, who paved the way for new kinds of recording and notation of human motion. Artists and programmers such as Thecla Schiphorst, Tom Calvert, Paul Kaiser, Merce Cunningham, and William Forsythe have developed novel algorithm-based techniques to write and manipulate movement instructions². François-Joseph Lapointe's choreogenetics spawns *in silico* dancers whose

¹ Apparatuses are here defined as "not mere static arrangements *in* the world, but rather (...) *dynamic (re-) configurings of the world*" (Barad, 2003, 816 (Barad's emphasis)).

² Calvert's *Life Forms* software (1986), developed with artist-programmer Schiphorst, inspired Kaiser's work for Cunningham's *Biped* (1999). Forsythe's motion databases *Improvisation Technologies: A Tool for the Analytical Dance Eye* (ZKM, 1999/2003) and *Synchronous Objects for One Flat Thing, reproduced* (Advanced Computing Center for the Arts and Design and Department of Dance at The Ohio State University/ Forsythe Company, 2009) likewise propose original approaches to digitised human movement.

movement sequences subjected to repetition, translocation, and conversion operations yield complex choreographic mutations (Lapointe, 2005). In purportedly popular culture, an eclectic movement like the Demoscene with its display hacks and software cracking events, migrating from 8-bit home computers to more powerful vehicles of modern-day subculture, also offers precedents for the virtuoso freestyling associated with coding performance.

Rather than on such initiatives that clearly pertain to live coding, I propose to focus on historically and geographically distant, non- or pre-computational, more-or-less open or instruction-based performance forms, set in their respective contexts or 'structures of feeling'³ (Williams, 1977). The selected works raise questions of feedback, fixed versus on-the-fly programmable events, and inscriptive practices and notation methods for live action. They fall outside what is usually qualified as live coding, to more generally involve algorithmic or generative 'real-time' arts. But herein lies their value⁴: by anticipating or mobilising affordances associated with live coding, earlier works can reveal continuities and discontinuities that enrich our understanding of this recent art form. Conversely, identification of such continuities and discontinuities enables a larger community of performance research artists and scholars to constructively position live coding in all its specificity.

Live feedback and/ as scale

Feedback in live coding has been categorised as nested loops that include (1) feedback between the source code and running process, (2) manipulation feedback between programmer or artist and work in progress, (3) performance feedback involving external outputs, and (4) social feedback encompassing the audience or co-performers in a distributed system (Collins, McLean, Rohruber, Ward, 2003). A broad take on feedback in live performance shows it to be strongly bound up in particular cultural frameworks: what is deemed effective feedback or determinant action in one context might be viewed as incidental or ineffectual in another. Meaningful study of an artistic movement therefore requires reference to concrete instantiations, placed in their 'fields of relations'⁵. We can surmise that loosely configured performance events more easily accommodate happenstance than those tied to tightly prescribed times and places, but actual examples are needed to get beyond blanket assertions: what is meant by 'loose' or 'tight'? How do these terms relate to the overall construction or duration of a performance work? At what level do we consider performance instructions or assignments to be non-reversible?

³ "For what we are defining is a particular quality of social experience and relationship, historically distinct from other particular qualities, which gives the sense of a generation or of a period." Williams, 1977, 131.

⁴ Beyond the truistic evidence that, if comparators are identical to the system to which they are meant to be compared, then comparison is not possible.

⁵ "The *possibilities* which the work's openness makes available always work within a given *field of relations*" (Eco, 1989, 19).

Performance history contains many genres where staged and everyday activities overlap to form temporally and spatially malleable frames open to real-time interactions. Mediaeval Christian passion plays performed over several consecutive days engage their audiences as co-celebrants in works that aim to spiritually elevate urban communities. *Ramlila*, an Indian theatre epic staged over ten or more successive nights, culminates in a procession to the town square where Rama's victory over demon king Ravana triggers festivities publicly marking the restoration of divine order. In forms like these, natural day-night cycles and moments and places for basic necessities like feeding and resting are integral to the overall experience, which momentarily cloaks familiar surroundings and activities in the fabric of mythical happenings. While episodes of Rama's or Christ's stories thus seep into everyday events and places, these events and places reciprocally play into the staged re-enactments: protagonists - who may include one's kinsfolk or neighbours - single out bystanders, invoke current affairs, take on hecklers, or otherwise improvise in response to local situations. So although well-known narratives are deployed according to expectations, i.e. they are not fundamentally derailed and so constitute broadly non-reversible events, their uniquely tailored experience wins public involvement that cannot be attained with rigidly compartmentalised theatrical forms. Whether religious or secular (as in royal entrances or tournaments), the porous framing of performances like these heightens a sense of non-repeatable singularity and audience adhesion, where real-time interventions enhance spontaneous participation and agency.

In contrast, an exclusivist regime that sheds a very different light on live coding is that of the 17th century French court, which developed the canon of academic dance as the negotiated product of multiple agents bound by different levels of feedback. Classical ballet code had to be usable for and co-developed with performers, including the choreographer, whose biomechanical limitations (gestural amplitude, speed, and precision) consequently fed into its elaboration. At the same time, dancers and/ or their audiences sought to defy and outstrip these limitations to meet demands for innovation and virtuosity. Divine monarchic status made Louis XIV the ultimate live coder: the unrivalled Sun King's movements were enshrined, while mere mortals had to obey his royal choreographer's programmatic directives. Accoutrements and costumes were prestigious cultural hallmarks that formed a kind of hardware, allowing certain moves and ruling out others, in turn influencing and being influenced by sets and viewing arrangements. Performances were devised and iteratively reworked according to hierarchical relations between the contributing art forms. As unique luxury goods exempt of reproducibility imperatives, court spectacles were savoured for their value as commissioned one-off, part-improvised events.

INSERT FIGURE 1 AT APPROXIMATELY THIS POINT

These creations underpin a practice which was steadily sustained and refined: Raoul-Auger Feuillet's notation system (1700), based on Pierre Beauchamps' pioneering work, dominated classical dance for the next 150 years.⁶ Limited documentation and the fact that early dance notation systems were mostly limited to floor plans hampers our understanding of how readily dancer-choreographers could actually rework classical code in the 17th century academy. Then again, this is a difficulty we face today when

⁶ Cf. Norman (in press, 2016).

trying to ascertain how freely live coders develop and navigate programming languages, how distinctive their respective systems really are, and how exempt from canonical or academic implications. Such questions depend on the contexts in which they are posed, and the expertise of those seeking answers. An observer of historic dance unfamiliar with Beauchamp's codified positions or Lully's commedia dell'arte influences finds it just as hard to gauge feedback in the creative process as an observer of contemporary live coding unfamiliar with languages like ChuckK or SuperCollider. Ultimately, these vastly different performance forms raise similar questions: how far can artists depart from recognised frameworks whilst ensuring legibility of dynamic processes, for their own and their audience's engagement (and which audience/s)? How conditioned are feedback loops by performance infrastructure (e.g. types and emplacements of visual and audio systems, audience position)? Or by the specific socialities and expertise of practitioners and/ or publics?

Programmability and combinatorial aesthetics

Dadaist and Duchampian framings of everyday life as art fired experimental performance from the 1960s by artists including, and inspired by Fluxus, Kaprow, the Judson Church group, and John Cage. Frames to distinguish aesthetically appreciable events from humdrum surroundings exert different kinds of demarcation to those employed in the durational performances evoked earlier. Whereas activities in mystery and epic dramas are framed to infuse everyday urban spaces, unplannable ad hoc activities in performances like Lucinda Childs' *Street Dance* (1964; see Banes, 1987, 146-147) acquire aesthetic value solely through their framing. This challenges thinking about runtime programmability: however fixed the apparatus through which it is perceived, the flux of everyday action conditions its makers' and observers' artistic experience, producing often creatively productive tension between framing devices that impose prescriptive logics, and their unmanageably evolving contents.

In macro terms, works integrating everyday life do not meet live coding criteria if, as in epic narratives, their framing mechanisms impose ultimately reversible outcomes. This is the case with the generative, rule-based methods used by Childs et al: in the end, their post-modern creations maintain their status as finitely programmed entities. But in micro terms, they are open to unpredictable real-time inputs that colour the overall performance, as in Trisha Brown's use of gravity as a 'machine for making dances' (*Accumulation* pieces (from 1971), and *Locus* (1975) (see Banes, 1987, 76-91; Brown, 2009). Such experiments raise questions about the level at which, within a wider performance matrix, we acknowledge the existence and effects of feedback. Just as it is difficult, if not arbitrary, to establish where an apparatus starts and stops ("apparatuses are boundary-making practices", Barad, 2007, 148), so also it is difficult to set the bounds of what we construe as a live performance.

Discretised, modular systems invented as a means to constantly renew performances can be viewed as precursors for live coding by virtue of their programmatic approaches. Etienne Souriau's *Two Hundred Thousand Dramatic Situations* (1950) draw on earlier combinatorial initiatives and dramatic forms - including works by Sophocles, Kalidasa, Shakespeare, Schiller, Ibsen, Pirandello, Sartre - to identify core functions, combinations, aesthetic properties, and motor effects

(sequencing and concatenation, reversals, and transformations) that can drive freely programmable staged action. Thematic constants like strength, opponent, value or good, recipient, arbitrator, and adjuvant are deployed across combinations weighted by specific tensions, generating dramatic vectors which converge or separate kaleidoscopically to produce a calculated 210,141 possible situations (which Souriau rounds off as 200,000). Souriau defines a dramatic situation as "the *structural figure* designed, at a given moment in the action, by a system of forces; that which is present in the microcosm, the stellar centre of the theatrical universe" (Souriau, 1950, 55). Theatre is the product of a particular quality of tension:

a kind of antagonism between action and situation: the one dynamic, the other static, the situation being (in Bergsonian terms) merely an artificially isolated moment in the duration. (...) action and situation are correlative. The action must lead to the situation, and the situation must lead to the action. (ibid, 48)

Souriau's *ars combinatoria* uses astrological signs that legibly symbolise and combine forces subject to evolving environments, to reflect "the state of the dramatic skies at a given moment." (ibid, 83). *200,000 Dramatic situations* thus arise from a set of initial parameters imbued with different dynamic functions that develop according to changing contexts. While it might be closer to generative art's autonomous workings than the authorial agency of live coding, this system's symbolic instruction base opens it up to complex interpretations and modulations of unrepeatable staged performances.

INSERT FIGURE 2 AT APPROXIMATELY THIS POINT

Early last century, Bauhaus artist Oskar Schlemmer combined mathematical, experiential and affective principles in his quest for new ways to creatively programme human motion (Norman, 2015). One method bases motion typologies on corporeal templates: a cubically stylised figure, a 'marionette' whose geometric features relate functional laws of the body to space, a 'technical organism' displaying potential rotation, direction, and spatial intersections, and a 'dematerialisation' figure conveying symbolic meaning with a star-shaped spread hand, folded arms signaling infinity, and cross-forming backbone and shoulders. In the *Triadic Ballet*, material and topological constraints of costumes dictate the dancers' movements: fouettés rippling diagonally across the stage unleash visual kinetics of the Spiral dancer's costume, while the vertically sliced bichromatic façades of the Disk dancers elicit sentinel-type rotations. Choreography and sound for the later *Glass* and *Metal Dances* epitomise physical qualities and symbolic connotations of these materials, while *Stick* and *Circle Dances* deploy rigorous geometric logics. The yellow, blue and red clad interpreters of *Gesture Dance* each comply with a distinctive sound and locomotor behaviour: Yellow's actions are saccadic, Red's are slower and orthogonally regulated, and Blue's are dragging or crawling. Yet for all their material and geometric formalism, Schlemmer's performance experiments explicitly prioritise authorial freedom of their human agents, combining rule-based aspects of live coding with scope for interpretation of instructional sequences. While it does not imply the game-changing real-time interventions of computer-based live coding, this interpretive scope within a programmatic aesthetic is a prescient feature of performance undertaken a hundred years ago.

Performance architecture and infrastructure as hard code residues

Movements and behaviours of human bodies are conditioned and scripted by the environments we establish as an essentially gregarious species: places for dwelling, work, leisure, and transit inform if not determine our movements. If coding consists of articulating sets of executable instructions, and if live coding consists of doing so extemporaneously and non-predictably, then built infrastructure with its physical fabric, locomotor implications and constraints might be considered as an instantiation or residue of live coding: "A building is a technology of movement - a technology of transposition - in direct membranous connection with virtual event spaces. It functions topologically, folding relational continua into and out of each other to selective, productive effect." (Massumi, 2002, 204). Viewing concrete buildings as sediments of live coding may be a matter of the scale at which we study the evolution of performance edifices, and their underpinning aesthetic and technological legacies.

The Athenian amphitheatre (circa 600 BC), Palladio's Olympic Academy in Vicenza (1580), and Andreu's Beijing 'Egg' (2007) might arguably be seen as part of an architectural programme whose practices and instructions are incrementally modified by scores of practitioners operating in broad swathes of 'real-time', to accommodate their successive generations' structures of feeling. The history of performance infrastructure reflects tensions of many kinds: upholding existing traditions to host familiar art forms, versus introducing radical changes to meet new demands, is one of these (Norman, 2012). Another tension results from opposing quests for open environments that instate everyday life as art, versus hermetic environments that fully control highly crafted artistic projections. Progressive sealing off of performance spaces, transforming open amphitheatres into the closed, perspective-inclined academies of Renaissance Europe, translates a gradually reinforced mastery of artistic space and time.⁷ The development of technologies to control light and sound compellingly separates such places from real-world environments: staged command of day and night, and of fictional soundscapes, makes live performance eminently programmable in and for its other-world autonomy.

The intertwining of performance containment and programmability - thus de- and re-programmability - is particularly well evidenced by historic shifts in design and implementation of lighting technologies. These have moved over the centuries from fixed, albeit ever more sophisticated sets, to ultra-sensitive on-the-fly systems whose operators are interpreters and even improvisers in live performance dynamics, ensuring key real-time changes to lighting programmes to which they were previously passively subservient. Lighting engineer, inventor and performance scholar Nick Hunt's analyses of 'state/ cue' and 'phase transition' models emphasise these microtemporalities of 'live coding' stage practices, with their computationally discretised, richly convoluted dynamics (Hunt, 2013; Hunt, 2014).

⁷ And the accompanying consolidation of institutional prerogatives. There is an interesting parallel between the rise of academies to celebrate live action (Olympic Academy, 1580) and to explore dead bodies (Vesalius's university town Padua built the first permanent anatomical theatre in 1595).

Innovative materials and mechanical systems that have driven performance experiments for centuries range from the machines to stage heavenly phenomena that delighted spectators of mediaeval sacred representations, to the elevated and mobile platforms used in contemporary opera and rock music productions. As well as implementing and developing such techniques per se, scenographer Jacques Polieri explored them as a means to programmatically differentiate audience experience, through events made physically, visually and narratively distinctive for each spectator. Each one of us engages with the world from our own vantage point, but Polieri sought to formally individualise experience by imagining a performance that would unfold differently for each viewpoint:

Observer X would see an action take place from point A to point Z, while B would follow an action from B to A having gone successively from B to C then from C to D etc. and on to Z to finish up with A (...). The pathways, dependent on providing a precise starting point and setting the type of actions, would thus be a function of an arbitrary organisation left up to the choice of the 'creator'. The trajectories would be diversely followed and structured, or might even be of a stochastic nature. This narrative cyclic combinatorial system (...) is a way of disrupting the genesis of the visual reading of an action, by permuting the order of observation points. (Polieri, 2002).

Polieri's 'combinatorial narration' moves beyond conventionally polarised actor-observer considerations to invest coding energies in structuring audience experience. His programmatic approach is a far cry from real-time algorithmic processes, but prompts reflection on audience agency in live coding's nested feedback systems all the more usefully since performance history is marked by recurrent challenges to and deconstructions of actor-observer type dichotomies.

Scoring code: prescriptive and/ or inscriptive practices

Live actions can be transcribed using symbols correlated with a reference field: musical scores, for example, are correlated with the performances that comply with them, as are dance notations. Correlations do not just mean one-to-one alignments of symbolic markings with given objects, but extend to overall modes or systems of inscription, and the ways they establish sets of relationships amongst their components (Goodman, 1968). In turn, overall systems of inscription, thus relationships they establish, are conditioned by understandings of scale: *longue durée* considerations allow buildings to be envisioned as an inscriptive system for historically evolving performance traditions. In the non-built environment, landscape architect Lawrence Halprin's 'ecoscores' are dynamic readings of landscapes that recognise the accrued geological processes that shape them, and actual kinetic features and movement patterns suggested by, for example, winding rivers or shorelines. (Halprin, 1969).⁸ Inscriptive or

⁸ Sandeep Bhagwati references Halprin's RSVP Cycles when describing his approach to compositional and notational processes, designated AGNI (Analysis, Grammar, Notation, Implementation); cf. *La recherche-cr ation: Territoire d'innovation m thodologique*, UQAM/ Hexagram, Montreal, March 2014, online at <https://vimeo.com/93185484>.

scoring actions can thus be read into systems that outstrip those devised by humans, as in mythological accounts that ascribe the creation and workings of our planet to superhuman agencies. Pursuing this logic and order of magnitude, the disruptive interventions of recalcitrant beings featured in many ancient stories might be seen as fateful modifications to symbolic instructions ensuring divine order. From this perspective, perhaps live coding's mission – at least in part - is to renew with the cathartic rule-breaking cunning of trickster gods like Hermes, Loki, or Maui.

Halprin's movement notation or 'motation' work, developed in collaboration with his partner choreographer Anna Halprin, takes community design as a scoring process, for example in urban contexts where "diagrams for city-street systems are scores, but the city street *itself* becomes a performance while being created, then a score again (S -> P -> S)." (Halprin, 1969, 85). 'Artists-as-scorers' assume responsibility for their community's creative drives through design processes called RSVP Cycles which operate in any direction or order, where R stands for human and physical Resources, S for Scores describing the process leading to a performance, V for Valuation, a term coined to suggest the action- and decision-oriented aspects of appraisal, and P for the Performance resulting from the score and conveying 'style' of the process.

INSERT FIGURE 3 AT APPROXIMATELY THIS POINT

RSVP Cycles as artistic creations are individually weighted signature events in terms of these interrelated components. Any items can form a score, so scores are potentially infinitely varied but depend on participant-interpreter consensus to be read as such. RSVP Cycles range from littoral initiatives like the collective building of *Driftwood Villages*, to *September 1970* which used the entire San Francisco city and population as an art medium over thirty-five uniquely designed days. Expanding on cross-sector, cross-cultural insights into diverse inscriptive practices definable as scores - including ecoscores, the I Ching, the biblical score with its creation model, PERT project management charts - Halprin's original historic work offers potential insights into the role/s of notation in live coding, and into the 'notation perspective/s' this particular performance practice might entail⁹.

In the computational context, editing source code to modify a running process (McLean, 2014) means using formal language - a symbolic system whose grammatical structure embeds semantic and syntactical requirements. In live coding, these requirements are manifest at both analogue and digital levels: abstract, autonomously evolving processes are necessarily - and excitingly - entangled with human input that cannot be reduced to the strictly computable or computational. When code is deployed or transduced by programmed, sensor-laden physical objects, instead of exclusively by a computer keyboard and screen, embodied and ergonomic aspects of the relationship are intensified. Code written in a runtime environment with strong temporal semantics and

⁹ Cited by Bhagwati (2011), Hermann Gottschewski's 'notation perspective' denotes the bias present in any notation and score in favour of performance elements easy to notate, and against those it is hard or impossible to notate.

flexible concurrency modalities is created to be executed and savoured 'hot',¹⁰ melted into a pool of feedback loops characterised by multiple levels of unpredictability - algorithmic computational processes, human improvisations, and environmental influences. As a formal language, live coding consequently seems to be positioned at the "chiasmus of folding between vitality and textuality" (Doyle, 1997, 61), or in the domain of 'gesturo-haptics', where notation forms that mobilise the live capture or sampling of physical activity per se comprise a unique kind of asymbolic writing (Rotman, 2008).

Just-In-Time (?) conclusions

As an arena for projecting and poetically modelling all kinds of liveness - from artificial lives conveyed by ancient techniques like puppetry, juggling, and magic, to a-life manifestations of software, hardware, wetware - performance offers a place, a time, and a means to celebrate meltdowns of habitual categories and frameworks, and the emergence of new energies. We are a pattern-hungry species forever searching for new signals, frequencies and scalabilities that can calibrate our exosomatic organs to the evolving environment for which we are responsible (Innis, 2002). Striving for rhythms ever closer to the bone of that thing we call real-time, to attain creative fusions of flesh and symbol, or 'machinic processuality' (Guattari, 1995, 90), is part of an archaic yet vibrant quest.

Ostensibly remote practices can provide critical distance from contemporary phenomena in which we are sometimes too thoroughly immersed, helping us rethink formal systemic parameters like scale of the temporal and spatial windows from we view creative processes, autonomy of those processes within the broader performance apparatus, and the ways feedback folds into the dynamics of live action. Focus on predigital creation need not avert attention from live coding's computational specificities, but can situate these specificities in an evolving history, indicating "a new kind of differential distribution of forces and movements (...) a differential distribution that itself differentiates over time." (Murphie, 2013). At the same time, this bigger picture shows how features of live-coding - the built-in vector-dependency and time functions of its algorithms - correspond to the specific time-boundedness of computational culture, with its intrinsic rhythmicity, speeds, and spatio-temporal agencements (paraphrasing Miyazaki's 'algorhythmics', 2012).

Live coding is a way of tuning our cognitive and sensory faculties to enfolded layers of micro, meso and macro temporalities, keeping up with or irreverently outwitting machinic and hybrid forms of liveness, gambling with their parameters, valuing agonistic creative engagement with powerful symbolic systems over their docile or numbly passive use. By virtue of its position beyond the contrived pseudo-liveness that lucratively 'animates' much recorded and mediated performance (Auslander, 1999), including the insidious performance necroworlds of late capitalism (Stanyek and Piekut, 2010), live coding is an adamantly critical practice. If creatively engineering our relations to time - a core artistic pursuit - allows us to bluff the intractability of our own

¹⁰ Urgency of 'hot' media is apparent in live coding denominations like JITLib (Just-in-Time Libraries), WTP (With-Time Programming), and Extempore features Sorensen describes as 'hot-swappable' (<https://github.com/digego/extempore>).

mortal lifelines, it also allows us to defy the reproducible, repeatable, predicted, predictable and predictive features of normatively digitised existence. Resistance to stabilised cultural forms, striving for incalculable, unfixable symbolic processes whose every performance constitutes a fleeting 'assemblage of aesthetic desire' (Guattari, 1995, 92), makes live coding a creative survival mechanism, a mutagen for the collective imagination. It may seem curious to evoke historical performance aesthetics and techniques in a forum focussed on this adamantly 21st century practice, yet it is live coding's very resilience that demands its positioning as part of a broader cultural legacy.

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Captions for figures

Figure1. Louis XIV as Apollo, the Sun King, in the *Ballet de la nuit* (1653), as portrayed by royal draughtsman Henri de Gissey.

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Figure2. Souriau's six basic dramatic functions (left to right) :

Lion = thematic strength / Sun = value or good / Earth = receiver

Mars = opponent / Libra = arbiter / Moon = mirror of strength

Adapted from Souriau (1950).

Figure3. Halprin's RSVP cycles, where R = Resources, S = Scores, V = Valuation, P = Performance. The cycles can start at any point and move in any direction, depending on the situation, scorer, and intent.

Adapted from Halprin (1969).