gruntCount (bass clarinet edition): blurring the piece/system/instrument distinction

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Abstract. Martin Parker's *gruntCount* is a multi-version, configurable composition for improvising musician (or musicians) and computer. Performers embark on a journey through sound processing modules that are specifically customised to individual playing styles. It exists in no fixed state, yet allows for a growing set of rehearsable, replicable and configurable pieces, in which all musical material, timing, overall duration and levels of effort are managed by the live musician. In order to optimise elements of *flow* and of *liveness* in each performance, *gruntCount* challenges traditional definitions of 'piece', 'system' and 'instrument', instead establishing an environment for human-machine improvisation that serves the musical result and not the system itself. This paper refers to a selection of sound examples from the bass clarinet edition (2012-14) and examines formal time-shaping possibilities within a structured performance, while exploring the environment's qualities of coaction and configurability in an era of new score types.

Keywords: live electronics, computer music systems, instrument, performance practice, liveness

1 Introduction

The work described here represents an attempt to address fundamental concerns of contingency and spontaneity within a structured framework that offers maximal performer agency, but also allows both composer and performer to be heard through the music. We would like to note without delving too deeply here, that this work also contributes to debates around the computerised landscape of live electronic musicking (Small 1998). Feenberg describes computerisation as a missed opportunity to inform and empower labour (Feenberg 1991). Citing Zuboff (1991, 94), he proposes that it has instead tended to further entrench divisions between management and labour. We see *gruntCount*'s approach as a step towards a more even distribution of authorial agency and view the 'computerisation of the musicplace' (to paraphrase Feenberg and Zuboff) as an opportunity to explore liveness, flow and nowness, rather than to impose even tighter restraints on the performer, such as those implied by pitch-trackers, tapes, click tracks and score-following softwares. This is not an ideological stance, however. Working in the ways we describe below, we like the sound that comes out—while the player is definitely improvising, what is delivered has the potential be a formally coherent concert item.

1.1 *gruntCount*: bass clarinet edition

Each edition of *gruntCount* is personalised from the outset, with composer and performer working together to produce the elements of a system for creating well-defined and structured musical pieces that invite liberal performer input, spontaneity and intuition. This preparatory stage usually involves a period of system 'training', in which the composer responds in real time to free improvisations and creates a set of interrelated digital sound processing (DSP) parameter presets unique to the player. These constitute the version settings. The electronics are all derived from the way in which these version settings respond to live input (there is no sample library). A trace of this *interactive,* improvisatory exchange is present in every subsequent rehearsal, performance and adaptation of that particular version.

Having designed these settings, the compositional agenda proceeds with the plotting of various journeys or *curves* through the DSP settings. These curves may resemble a graph or automation curve, but in fact represent specific trajectories through a *parameter space*, which itself has nested settings within it. There is a formal design here, a quality and style, and yet the manner in which the piece is individuated is entirely defined by the live performer, whose physical effort in producing sounds (or grunts) moves the assemblage forward.

The vertical playhead in the *gruntCount* interface, passing from left to right through the performance, will only move when excited by sound. This affords the performer absolute control over the initiation of the piece, and a considerable degree of influence over its pacing and flow. Notably, the ability to create moments of suspension within the reactive electronics is possible when the player is silent or plays under the activation threshold.[1] By setting the number of grunts to be detected, the approximate duration or *timespace* of the piece may be estimated. This timespace, in conjunction with adjustment of the input threshold volume, determines the level of effort that will be required to bring the piece to its conclusion. In this way the immediate concerns of the performer on stage are not system-based but sonic and musical. The player can openly respond within an ongoing feedback loop, "managing unfolding states of attention." (McCaleb 2011)

The first incarnation of *gruntCount* was created with flautist Anne La Berge in 2011, and the environment was soon adapted for other improvisers. An initial stand-alone application made in Max/MSP 5, incorporated *gruntCount*'s distinctive graph-like interface (Fig. 1). This version was used for the bass clarinet premiere in Edinburgh in March 2012, as well as for the CD recording session (Parker, 2013).[2]
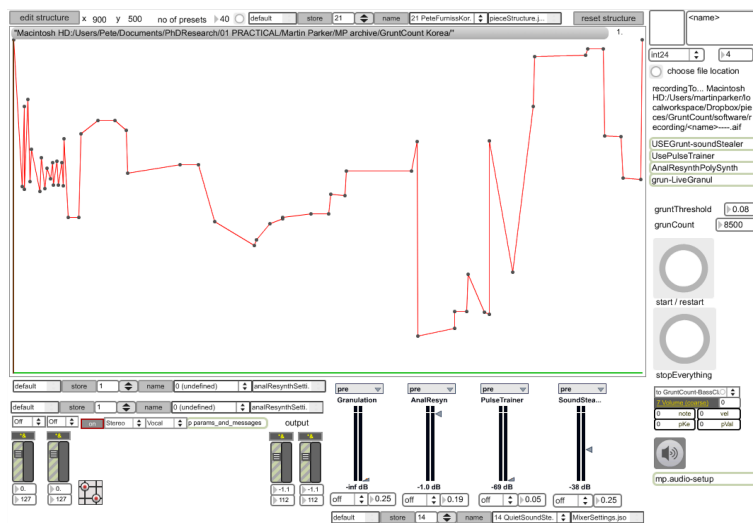

Fig. 1. The interface used in the first version of *gruntCount*

An updated version in 2014 was created anew from a second studio session.[3] It has a refined interface, branded for the publisher sumtone.com (Fig. 2), and features an ordered setup procedure designed to be learnable by non-specialists in digital audio technology. A short video tutorial by the composer is included to facilitate this learning process, which here allowed for practising to begin

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[1] Listen to gruntCount-Example-PlayingUnderTheRader2-ObjectsOfSound2.wav and gruntCount-Example-PlayingUnderTheRader-laptop.wav, http://dx.doi.org/10.7488/ds/170.
[2] http://sumtone.bandcamp.com/track/many-boffins-died-to-give-us-this-information
[3] March 26, 2014. University of Edinburgh, Edinburgh College of Art, Reid School of Music.

within 30 minutes of downloading the software package.[4] Finally, full-screen display functionality is added for any laptop size, so that visual elements are optimally viewed and attention can be managed without irrelevant distractions. In April 2014, a remote application was added to allow for hands-free, on-stage operation of the main settings by the performer and for expression pedal control of overall output from the electronics. This small addition had the unintentional yet profound consequence of affording absolute control—a power of veto in effect—to the live performer, now able to suppress the electronics, fade in or out, or conclude the entire piece before the end of the curve.[5]

Fig. 2. The updated version of *gruntCount*. Setup procedure is ordered down the left hand column, including version and curve selection, an array of audio in/out settings, sample rate, vector size and microphone input(s).

2 Piece, system or instrument?

The following section will examine how *gruntCount* inhabits aspects of piece, system and instrument, and how, when played, it blurs the distinctions between. We have seen the way in which *gruntCount* pieces are enacted from the performer's interaction with the on-screen notation. Players are also at liberty to create and store their own plots within the software, thereby providing the potential to use *gruntCount* as a tool in other musical contexts.

2.1 The piece model

A piece of music may be described as a discrete unit that has some replicable features for future performances. It has a structure and a quality of style or aesthetic that is imagined in advance of a performance. A piece is more or less predictable, and has a relatively consistent duration. Pieces are (for our purposes) inherently hierarchical—pitches and their order, note lengths, tempo, dynamics and other elements are prescribed to a degree and require a score or other form of instruction. The composer's role is to imagine, to create, shape and notate, whereas a performer will learn, practise, interpret, reanimate (Emmerson 2007) and reveal.

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[4] https://vimeo.com/111283604.
[5] Listen to 140527_LivePerformance_Edinburgh_objectsofsound_02.ogg and 140723_LivePerformance_Edinburgh_jazzfestival_02.ogg, http://dx.doi.org/10.7488/ds/170.

Representations of imagined music for interpretation by another person inevitably involve a measure of indeterminacy. Elements of timing and space, fine-grained dynamic shading and phrase shaping, as well as adapting the piece to different venues and concert scenarios mean that all live music is in flux. Pieces are always subject to contingency and intuition in performance. The *gruntCount* software is, at least in some sense, a score. The curve produces a structure that reflects compositional choices and projections, constituting a framework around which the improviser *negotiates* a path through the piece.

A *gruntCount* curve represents an act of formal composition. Whilst this is a replicable form, to be re-enacted anew, a high value is attached to considerations of liveness in performance and to the improvisatory skill of the experienced performer. Like a piece, *gruntCount* requires practice—it must be learnt and understood. It requires the finding of techniques and the building up of a bank of experience and familiarity. Getting to know and recognise the character of an electronic part is analogous to learning the other instrumental parts to a piece of chamber music or concerto (Winkler 1998; Pestova 2008). Familiarity with the behaviour and character of the composer's DSP settings (the *orchestration* of the electronics), their particular ordering and nuancing within the composed curve, and discovering the potential for drama or space in the whole, requires rehearsal.

However, the intention from the outset in *gruntCount* was to bring performer agency and autonomy to a level approaching that of the non-hierarchical structures accessible to improvisation ensembles (Lewis 2000). By inviting a co-created and improvisational quality to each performance of the same curve, some aspects of *gruntCount's* pieceness begin to blur. The more it relinquishes hierarchical interrelations between creator and enacter in favour of a model of coaction, the more systematic it becomes.

2.2 Systems

As a configurable composition, *gruntCount* could be seen as a contribution to contemporary obsessions with choice and individuation. However, we were more interested in the idea that configurability, choice and individuality are innate dimensions of music. Performers discover what it feels like to play within a constantly adapting environment, choose how to play, what to play and when, but with the confidence that a plan for the improvisation is already in place. In this respect, *gruntCount* is presented to the player as a system first, then a piece.

Computer music systems tend to be designed to anticipate a wide range of input—they don't just do one job. They are not limited to producing music of a specific duration and most systems are built robustly with the expectation of being used by others. They are also highly configurable, so that parameters may be adjusted to allow for the independent musical style and aesthetic of various users. *gruntCount* was developed as a composition system with flexibility, adaptability and scalability built into many aspects of its design. Its systematic nature evolved iteratively as different problems and solutions to them became apparent.

Systems theorists well know that a system imposes itself upon its users in stealthy ways: "when a system is set up to accomplish some goal, a new entity has come into being—the system itself." (Gall 1975) When using music systems for piece creation, they also bring a voice to the composition. In the case of *gruntCount*, as work with more performers developed, composerly considerations of sound and form shifted towards designerly issues of interface and ease of use. At a point in the system's development, it reached a stage where it became impossible to change the behaviour of some of the sound processing modules without rendering obsolete all of the previous versions for multiple instruments that by then were travelling with various performers. In this way, the system had imposed a block on its further development. New versions can of course be made, but changes to the components can no longer be implemented.

One unexpected outcome of working on the bass clarinet edition was a warping of the system's purpose by the player to create a kind of simple, bespoke digital effects rack. By creating fluid curves

within isolated bands of just a few selected settings, distinct units of sound processing became available as the basis for the bass clarinet's character in a recording session of improvisations with a guitarist. This act of appropriation (or 'patch-hacking') by the performer reflects a confidence in its operation and configurability, and demonstrates a form of instrumentality in the combined assemblage of acoustic instrument and computer music system.

2.3 Instrumentality

Before it sounds, an instrument must be played, requiring a more or less ongoing input of energy to maintain its sound production. It is spontaneous but limited to a definite character. Its timespace is only set out in the number of simultaneous sounds that can be made and their duration (the resonance of a string or drum skin, for example), but remains otherwise open. Acoustic instruments are resistant (Waters 2013; Parker 2007) and experiencing these resistances requires the player to either overcome them or explore their qualities and limits.

Schroeder and Rebelo frame the performer-instrument relationship as "a multimodal participatory space" (Schroeder & Rebelo 2007)—one in which all elements have an affective influence. They argue against the objectification of instruments as extensions of the body, where the relationship with the performer is seen as "a transfer from the body to the world", preferring a back-and-forth interdependence that is revealed by an exploration of physicality and resistances. "This means that the performer only becomes acquainted with the 'thing' at hand by being able to test boundaries, negotiate subtleties and uncover threshold conditions." (*ibid.*)

Because of the the constant slippage of certainty away from the player in *gruntCount*, and the not-quite-knowableness of the parameters (nested dynamism), situations arise which require practice, familiarity and the development of a contingent and nuanced control. It then becomes possible to 'play' the whole, making subjective decisions about sounds and their qualities prior to and during a performance. Choosing the number and types of microphone and loudspeaker to use and their positioning, for example, and the balancing and spatialisation of the software output alongside the amplified live sound, can be determined in advance, very much as part of the setting up of an instrument for performance and integral to the idea of an individual player's 'sound'.

Riva and Mantovani suggest that in *first-order* mediated action (acquiring fluency in the use of a tool) our perception of our bodily selves moves outward (Riva & Mantovani 2012, 206). They explain that our sense of space and what we can do in it operates by integrating two "reference frames"—the *peripersonal* (immediately reachable with the body) and the more subtle *extrapersonal* (how we remember and learn to relate to the space beyond our reach, and to objects in it)—and conclude that "our peripersonal space is extended by the proximal tool: we are present in it." (*ibid.*, 207) Developing the operation of a secondary (distal) tool constitutes *second-order* mediated action—in our case performing with *gruntCount*—and "shifts the extrapersonal space to the one surrounding the distal tool: we are present in the distal tool and in the space surrounding it." (*ibid.*, 208)

Green also remarks that we tend to focus on the "material boundaries of whatever particular device is taken to be the locus of sound production", whereas from a wider viewpoint, "objects form a part of a network of relationships with other objects and with people." (Green 2013). These relationships are in constant flux, so there must be an ongoing reassessment of the nature of the environment. We can therefore view an instrument as a "coalition of resources being used *at a particular moment*." (Ibid.) One *interacts* with an instrument to form a broader one, blurring the distinctions between elements in the performance ecosystem (di Scipio 2003; Waters 2007). A new human-instrument identity is established as an aggregate, and it behaves as an assemblage of intimately tied agents.

3 Nested dynamism

The signal processing in *gruntCount* is made up of four 'voices' and three live 'effect' processors. Voices are content creators/co-players, in that they respond to and develop material provided by the player. The effects are used as colours that help to smooth between live sound and processing. Live player or computer voice can be mixed into any of the live effects. Every sound a player makes pushes the playhead through a slippery set of parameter changes that are linked to audio processing modules mixed in parallel. Live sounds have the ability to cause settings to change, which is exciting for the player, as the ground shifts beneath them with every note that's played.
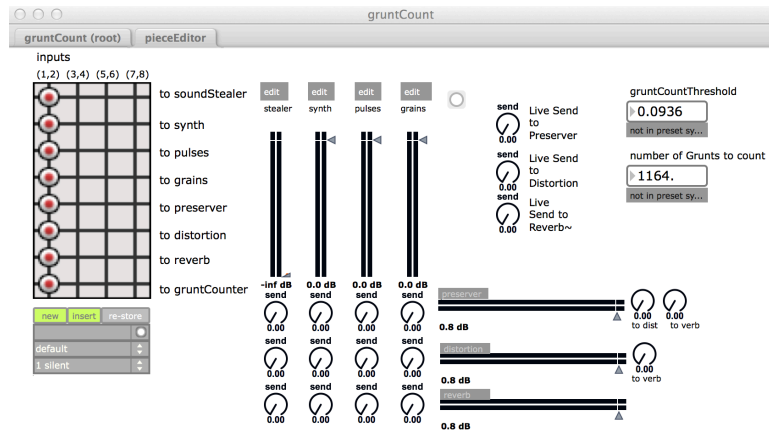
Fig. 4. The *gruntCount* mixer window. Four 'voices' (middle) are content creators and co-creators, live 'effects' (right) help to colour both voices and performer sound.

The state of each moment is also modulated by sound. For example, in the 'soundStealer' voice, different amplitudes of input trigger different live sampling processors, that can also listen to each other's output and sample that. One sampler might take only very loud sounds, another may be ultra-sensitive and pitch-shifted deeply. The processing employs a method that we describe as 'nested dynamism'. This idea is key to sustaining a sense of movement and flow in the computer part and maintaining a distinctive, meaningful and dynamic relationship between player and electronics.

3.1 Liveness and flow

The flow of any improvisation—its pacing, coherence and sense of space—is directly influenced by the way a musician maintains an inner thread of *attention* throughout the performance. This may also be understood as the managing an evolving flux of liveness. Several authors have proposed a deeper understanding of liveness as incorporating various *qualities* (Stroppa 1999; Emmerson 2007; Croft 2007; Sanden 2013) and it is to Sanden's terms for a nascent taxonomy that we will refer here:[6]

- liveness of spontaneity
- interactive liveness
- temporal liveness
- liveness of virtuosity
- spatial liveness
- causal, or corporeal, liveness

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[6] although rather out of expedience than any suggestion of ideological supremacy.

- trace corporeal, or vestigial, liveness
- liveness of authenticity
- virtual liveness

The *gruntCount* performer directs and influences some of these qualities, such as the *spontaneous* liveness of improvisation, the *interactive* liveness perceived in moments of wrestling or negotiating with the electronics, particularly since the system is designed to produce occasional unexpected elements (a kind of benign provocation). While *gruntCount* is purely reactive, any perceived sense of interaction should not be dismissed. Emmerson has proposed that "what we perceive when we perceive 'interactivity' becomes a measure (but not *the* measure) of liveness" (Emmerson 2012, his emphasis) and Sanden goes further, claiming that "the value of liveness is not located in what is *actually* happening but in what we *perceive* as happening." (Sanden 2013, 109)

There is also a *temporal* play of liveness during a performance: the electronics refer back to the initial studio session, reactivity happens in the moment and the sampler is fed with material for future regurgitation, which we then recognise from the recent past. There may also be a liveness that resides in the performer's *virtuosity*. There are qualities of *spatial* and *causal* liveness, since both musician and loudspeakers are physically present in the room—the resultant sounds can be heard and the player's effort witnessed. Spatial frames may be played with (Smalley 1996) in both the electronics and the setting up of any amplification on the instrument. These can be manipulated in settings (panning or spatialisation) or by using physical movement; for example, by withdrawing from the microphone to starve the system, or conversely by moving in close to it in order to play very quietly, combining low input with high gain, rather like an electric guitar.

Certain elements remain outside the sphere of control of the performer, such as the *trace corporeal* presence of the composer, his *vestigial* traces of will, and other spectral elements from the wider culture which affect live performances but remain mostly unnoticed. Notions of *authenticity* contribute to liveness—in *gruntCount* we are true to ideas of what the piece/system should and should not be and do, to the way the live instrument and electronics should sound (artistic voice), and to how the whole reflects the relationship captured in the initial studio interaction.

Finally, there is what Sanden terms *virtual* liveness in digital technologies, addressing the significance of identities not actually present, but formed in the minds of performer and audience. Humans exhibit a tendency towards animism with regard to objects and to a "systematic anthropomorphism" (Guthrie 2012), which by extension may lead to the projection of virtual personae in an interactive computer music environment. In a performance of *gruntCount*, player and listeners each experience this subjectively and may perceive it (as this performer does) as a form of *personality* within the electronics. This seems to be helpful, perhaps even necessary—after all, to wrestle, to negotiate, to play, to make music together, requires a partner, a companion, an adversary.

The balancing of these various elements forms part of the musician's embodied knowledge and skill as acquired over a considerable period of time. This shifting assemblage of liveness qualities can produce a sense of abstract narrative, a more or less taut thread of attention drawn between musician-instrument and audience. When successful, this thread may contribute to another sense of flow: that of 'optimal experience' (Csikszentmihaly 1975),[7] where the perception of time is altered or even suspended and levels of concentration, motivation and enjoyment are significantly raised.[8]

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[7] which is here connected to an idea of optimum user experience (UX)

[8] This is not the place for diving into a detailed discussion of flow as optimal experience. Which is not to say that studies of flow in musical performance are still relatively thin on the ground (Wrigley & Emmerson, 2013) and that research in this area would be both welcome and potentially influential.

4 Blurring: what's in it for me?

4.1 Performer interview

MP: As a performer, what do you gain by overlapping these edges?

PF: It's not a piece, not a series of pieces, anymore. For me it is an *environment* in which I can quickly access either a way to put together an existing piece, a way to create a new one, or even a way to provide the basis for a hacked software instrument. I also learned as I used it—it taught me things: how to set up a live electronics system, about configuring DSP settings and soundcards, how to manage the input coming into the system with the threshold and number of 'grunts'—at which point I realised these adjustments are to do with the level of physical effort in a performance. It helped me to feel like an active and invaluable agent in a creative musicking process.

In performance it's a bit like going into a wrestling bout, or a tricky negotiation. It's that same feeling you have when you're about to do a free improv with another person that you know well: you know the sorts of things that might happen, you're in a space you've been in before, but you don't know exactly what's going to happen. It provokes you but you can poke it back, and stoke it up with chaos knowing that it feeds on all that high energy. It can also be surprising and playful, amusing even. I remain open in the way that improvising actors are open to receiving offers—*gruntCount* makes a lot of offers, but I have the choice between control and influence and can also choose deference to it. I can just let it be.

On a more prosaic level, as a system it allows me to manage the *physicality* of my performance, which is important for a wind player. I pace myself by manipulating the settings for each performance, and define the level of effort required to get through a piece, up to a point—of course, you never know where it's going to take you exactly. And when it came to finding a solution for playing solo with electronics at short notice, I only had to learn a few small things to get *gruntCount* to do what I needed it to do. It already sounded great, and responded to me in a way I was familiar and happy with. Sometimes you need to just go with what you know.

4.2 Composer interview

PF: What do you get from performers across different countries carrying this around in their backpacks?

MP: As an experimental musician, it's frustratingly difficult to run actual experiments on the same idea that many times. More often than not, similar experiments tend to run across multiple projects when the fortuitous opportunity to get some music out there comes along. However, in the case of *gruntCount*, I've been able to repeatedly explore this work with multiple players in many different contexts and it's so far had an exciting life. I've learned a lot about the range and scope of collaboration between player and composer.

I discovered that if you try to rush the initial stages where settings are designed, you just don't get very coherent sound worlds that work with the instrument and the player longterm. However, if you're careful in the training stage and if the performer practises the curves, much like they would a score, the piece takes shape very quickly. I have also discovered that if a performer understands how the software works, what's going on under the hood, even a little bit, their performances are very strong.

It's important for me that this work sounds live. I want to hear the performer thinking through what's going on, playing with their own sense of anticipation, tension and release. For me, this is where music really starts to happen. I've often thought that a player on stage who is free enough to think about what's going on in the room, they're perhaps not feeling oppressed, tense, or subject to demands that are beyond their control. A player who is thinking is a player who understands, is well informed and practised and for me when *gruntCount* works, it's got the sound of spontaneity, a here and nowness that's considered, not just bursts of energy.

7 Conclusions

The main compositional aim for *gruntCount* was for it to behave credibly as music on stage, while meaningfully addressing challenges of liveness and spontaneity. The identities of visible performer and instrument on stage, as well as perceived virtual identities within the purely acousmatic electronics, become part of a *gestalt* in which each element is augmented. While existing as both a set of discrete, replicable pieces and a configurable system with which to make these pieces, we have discovered that *gruntCount'*s ease of use and emphasis on performer agency also afford it qualities of instrumentality. This level of user experience is to be welcomed in live electronic music practice and appears to engender flow in the performer, although more tailored research[10] is needed to confirm this.

By making a piece with a system that plays like an instrument, we further blur the definition of each. Importantly, our individual roles are also smeared. The performer does much more composing and top-level piece design, taking greater overall responsibility for what is heard. Meanwhile, the composer becomes a more expert systems designer, making fewer concrete decisions about what should happen on stage, instead defining a range of possibilities that afford what *might* happen. Given the numerous considerations involved in mixing and blending acoustic sound with electronics, both composer and performer also become instrument builders. The blurring of these roles, and the shifting of their emphasis in appropriate directions, leads to an environment where both composer and performer are able to focus more on bringing liveness and spontaneity to musical ideas.

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