

Unauthorized: Collaborating with a Performer Collaborating with Creative Systems

Arne Eigenfeldt

*School for the Contemporary Arts, Simon Fraser University,
Vancouver, Canada
arne_e@sfu.ca*

Kathryn Ricketts

*Faculty of Education, University of Regina,
Regina Canada
Kathryn.Ricketts@uregina.ca*

Abstract

Unauthorized is a collaboration between a composer/coder, an ensemble of intelligent musical agents (musebots), and a dance/theatre artist who inhabits a character named Rufus, a tired clown that struggles to find humour and meaning in dissonance. In *Unauthorized*, we draw a parallel to the work of Samuel Beckett, which echoes the profound absurdity often found in the clown. In this rich collaboration, we explore new ways to approach narrative, character, setting, and props; Rufus becomes a catalyst for fractured narratives and new ways of making meaning through performance. In the telling, we trigger more stories, which fosters a sense of collective belonging by the nature of their commonalities and subsequent empathy. Musebots are musical software agents trained on a variety of corpora to generate music live, producing new music for each performance. They also react to Rufus' movement and speech, in turn influencing the next choices in movement, intention, tone, and expression.

1. Overview

Unauthorized brings together intelligent musical agents – musebots – with a dance/theatre artist in a thirty-five minute performance. It continues the collaborations of the second author with a wide variety of partners, both physical and digital, as well as continuing the collaborations of the first author between his musebots and live performers. The unique aspect of research creation that will be highlighted in this paper is the use of text to shape a generative performance, specifically a full-length work which required a variety of approaches to structure, form, and narrative.

The work has been a year in its making, with several performances and workshops during this time. The genesis of the collaboration began after both authors attended a conference on music and technology in October 2018, and a realization that they were exploring similar themes in quite contrasting ways. An initial performance after three months of discussion and testing, provided a positive proof-of-concept, in which they explored the potential for a live performer to interact with generated text, both through movement and spoken word. An informal performance was presented seven

months later, which introduced the separate movements which had developed, albeit with limited transitions between them. A full performance was presented in October 2019, with three separate shows in a traditional black box theatre. A defining aspect of the collaboration were intense working periods of several days, separated by weeks, often months, of individual development necessitated by academic positions in different cities.

Unauthorized is a work of generative art in that performance actions – movement, live text, musical details and structures – are generated during the performance, and are unique and different with each presentation. What the authors found to be a particularly challenging aspect of this work is balancing the excitement of such mercurial features, with a realisation for the need of a consistent large-scale formal structure – e.g. movements – that could be relied upon to have a certain consistency. Each movement seemed to require an identifying character (as is often the case in multi-movement time-based works) in which the responsive and generative character of the musebots differed, and the live character's action evolved.

The initial proof-of-concept performance was very successful: musebots were assembled that could select from pre-recorded text reacting to an expert performer intimately familiar with improvisatory movement and speech. Eleven different texts were used, and the musebots transitioned to new texts whenever they believed a significant amount of change had occurred in the movement (a parameter which initially was manually controlled by the first author during the performance). The presentation was limited to under ten minutes, an ideal time for audiences to maintain interest in a single gesture performance. But how could this build toward a full evening performance?

2. Generativity vs. Interactivity

The first author has had significant experience with both interactive computer music [1] and generative music. The former finds its roots in the work of composers such as David Behrman [2] and Joel Chadabe [3], who created software systems in the 1970s and 80s that could react to performance input. These were reactive systems that were limited in their actions, which often amounted to a series of available algorithms from which the composer selected in performance: for example, if a note from the performer comes into the system, the algorithm might play a five note melody using the limited pitches of a pre-selected scale. Such systems, while varying in their detail between performances, required the composer to make high level musical decisions – for example, when to change the algorithm, and when to change the underlying musical structures such as harmony and rhythm – as well as overall interaction: for example, adding or removing processes to reflect the live performer's overall evolving musical shape. The intelligence in the system clearly was in the live performer and the composer controlling the system; while some systems were able to move between high level decisions autonomously, they did so using random processes [4].

With much faster computers and dedicated music computer languages (i.e. Max, SuperCollider), interactive systems became increasingly more complex and difficult to control in performance by the late 1990s and early 2000s. As a result, the first author began to use elements of artificial intelligence in order for higher level musical decisions to be made by the software itself [5]. Multi-agent systems, one such concept borrowed from AI, share many aspects with improvisatory music ensembles: they are proactive,

reactive, autonomous, and social [6], and have been the basis for the first author's work for over ten years, and the foundation of musebots [7].

2.1 Generative Systems

In 1996, Eno came up with the term Generative Music, which codified a practice implicit in the above described interactive computer music systems, but not explicitly stated: the notion that a system could produce multiple iterations of a work, and each would be considered viable and representative of the work itself [8]. Given Eno's definition, any *system* that improvises could be considered generative, albeit without live control; in other words, generative systems should not be interactive. The authors challenge this binary restriction in the work described here: portions of *Unauthorized* include live performance actions that influence the overall outcome; however, without any performance action, the movements would proceed, and the musebots would produce music, albeit with limited variation, thereby qualifying the work as pure generative. For *Unauthorized*, the dependence upon live action is not considered a limitation, but an obvious and necessary part of the work itself.

3. Movement Improvisation

The second author has been a professional dancer for 40 years, working in companies that generated choreography through improvisatory processes, rendering the making of a piece of dance a long and deeply personal journey. Other experiences include performing on moving buses, on high levels of scaffolding, in dirt filled warehouses, and in Royal theatres, as well as collaborating with opera singers, clowns, magicians and musicians. Her work experimenting in this realm has had

over a decade of practises which resulted in sensors strapped to various parts of her body determining image and sound shifts in the performance, furniture and objects wired with stories that are activated when touched, to social media and geo-positioning systems projected on the floor and her body in exploration of crowd-sourced place-based stories, to spontaneous mark-making projected on her body, resulting in immediate kinaesthetic comic-bookings.

3.1 Characters

The second author has worked through and with an improvisatory character named LUG for fifteen years. This character, donning an old overcoat and felt hat and always 'lugging' and old leather suitcase, dances stories of displacement, longing, belonging and in-betweenness. LUG worked /works as a kinaesthetic conduit to other stories. By choosing themes that may resonate with particular audiences specific to a performance workshop and then by poeticizing these themes through dance theatre and with the handling of simple artefacts such as a suitcase or a handkerchief as a metaphor, it is possible to trigger individual stories in the reading of the performance. LUG creates a porosity whereby stories, through lived experiences, commingle with the viewers individual stories and in this meeting ground of personal narratives, we discover commonalities that bond us.

Since the inception of LUG, the second author created two more characters, one of which is Rufus, a tired clown that struggles to find humour in dissonance. This character is steeped in what we may identify as failure, but with further interrogation, we understand that Rufus invites us into the fertile place of the unexpected, the unplanned, and the unintended.

Rufus also plays a key role in the second author's teaching:

"Rufus has been in direct relation to the new liberal turn in universities and the consequential shift in student expectations and operative behaviour. I find that our students increasingly need precise directives with assignments, which will guarantee an expected and prescribed outcome, and yet the work field they are entering demands capacities that are developed through opposite processes. Our students can't even know most of the detailed demands in the field as it is in constant evolution and therefore it behoves us, as teachers, to prepare them for the tenants, not the specifics that are reliable within this influx. A key set of capacities within this approach is: resilience, courage, curiosity, holistic intelligence, compassion, and kindness. Rufus has all of these characteristics and was developed in response to this festering concern that my students are no longer interested, and in some cases able to take risks and subsequently have lost the resilience to embrace criticality. Rufus was developed to rebuild the courage and curiosity, to encourage others to take risks, to celebrate mistakes, and to understand that error is both foundational and necessary for growth."

The current work has built upon previous collaborations of the second author which examined, interrogated, celebrated and experimented in melding movement with music and technology. The second author states:

"My work experimenting in this realm has had over a decade of practises as I have had a thirst and curiosity to collaborate in ways that push my improvisatory work beyond my own pallet of choices. In all of this work, I have been afforded the opportunity to grow my capacities as an improviser

and to work beyond my familiar and even habituated sets of conditions, contexts and creative frameworks."



Figure 1. The second author as Rufus.

4. Samuel Beckett: Fail Better

The authors turned to Beckett [9, 10] for the text to support this work, of which they are not authorized to do (hence the title of the piece). The authors are reminded of how Beckett invites us to trouble our own value systems in constructing and viewing theatre, whereby the plot line and locations are considered secondary to a motif, such as waiting, which becomes an existential event. The authors are also interested in the sensuality of text and how it can roll around in through an image into the body similar to watching clothes being tumbled in the dryer and then at moments being able to identify a sock in the blur in this way. Barthes writes about

this sensuality of the text, "...it granulates, it crackles, it caresses it grates, it cuts, it comes: that is bliss"[11]. Barthes invites us to dismantle the conventional structures of the reader/writer relationships and to engage in the text merging these positions. He invites the reader to become full bodied in his/her event of meaning making. "What is significance? It is meaning, insofar as it is sensually produced" [11].

Unauthorized builds upon previous work of the second author's, who has worked with the text of Roland Barthes, Gertrude Stein, Samuel Beckett and a wide scope of poets who support these problematizations of traditional linear constructs of language in relation to narrative.

"We have come to understand the nuances of gesture, smell, touch, sound and sight to inform the lives of teaching, theorizing and performance—this is sensuous knowledge" [12]. As Abram says, "meaning is birthed in the soil of the sensory world, in the heat of meeting, encounter, participation" [13]. The nature of embodiment is not only about the body, but it is the intersection of body, mind, soul, and imagination. It is the imagination with flesh on it, the soul with wings, the mind with feet. Embodiment breaks down the binaries of either/or and creates a space for a visceral inquiry into what it means to re/search.

5. Description

As mentioned, *Unauthorized* is a collaboration between a movement artist, the character Rufus, a composer/designer, and an ensemble of intelligent musical agents. Indeed there were many collaborators in this process of making *Unauthorized*, which delighted the authors in the quest to broaden and deepen their context for performative choice making.

One of the unexpected partners in this process was silence. Within the silence of their practice, side-by-side in the studio, the second author was

"able to develop discernment, deep listening, care in my observations and the curiosity and courage to take chances with my choices without the safety of approval. And isn't that what Rufus actually wanted of me? So the hidden gift of this process is that the foundation of this character was actually developed further and refined due to the specific nature of this partnership and the process that ensued due to our differences."

The authors' process was a blended model with long distance communications, individual work in studios (both dance and sound) and punctuated with intense face-to-face work that would then define the next step of remote, individual work.

5.1 A Non-teleological structure

As the sections begin to take shape, these in turn developed a voice, which spoke back to the authors in terms of tones, dynamics, gaps and sequencing. A question arose as to whether the length of the work could sustain the absence of a linear narrative. The musebots, with their irreverence to predictable trajectories, and Beckett's text, with such fluid logic, reaffirmed a poetic and non-teleological path.

The rehearsal of *Unauthorized* demanded a discipline to resist fixing choices. Although transitions would become clear from one section to the next in regard to sound, images, lights and movement, each container, each section remained an open country with its own set of customs. These customs were comprised of both

limitations and possibilities in time, space, sound, costumes, props, lighting, text, and even the atmosphere in the room afforded by an audience. The holistic intelligence of choice-making becomes paramount within such complexity.

Each night that *Unauthorized* was performed, the authors engaged in conversation with the audience immediately after, and this invariably affected choices for the following evening to a degree that on the final night, an entirely new scene was added. The authors continue to be attentive to new contexts and conditions, responding as a team to new sets of customs with each performance.

5.2 Rufus/Musebot interaction

Musebots respond to Rufus' voice and movement through realtime analysis, creating a synergistic play between sound, text, and video, adding a richness of the creative choices and subsequent provocations. Aware of each movement's text, the musebots respond, provoke, and influence Rufus' movement and speech choices, as well as determining certain structural choices in the work itself.



Figure 2. Live video of Rufus (above) and pixel differences between this frame and previous frame, shown in white (below).

Movement analysis consisted of a MaxMSP/Jitter patch that compared successive frames, setting those pixels that differed between frames to on. This provided a simple mechanism, through averaging, for determining the amount of movement of Rufus' character in the frame. This parameter value was sent as a measurement of arousal, a parameter (along with valence) to which all musebots respond [14].

In the six different sections, the interaction between Rufus/Kathryn and the musebots varies, as described below.

5.3 Introduction

This movement used Edvard Grieg's *Peer Gynt Suite*, specifically a version recorded

by Duke Ellington and his orchestra. The recording was previously used by the second author to introduce Rufus to the audience, and had a specific feeling that the authors wished to retain. Grieg's version for string quartet was used as a corpus, and transcribed for Disklavier, essentially a MIDI-controlled player piano. Specific velocities – how hard individual notes were played – were controlled by the amount of Rufus' movement detected.

Furthermore, the detected amount of movement was averaged over each second and determined the big band orchestration performed. Musebots were assigned to play instruments of the Ellington band – saxophones, trumpets, trombones – each with a potential likelihood of playing, or joining in, on a phrase. For example, the first trumpet had a high likelihood of playing each phrase, while the third trombone was much less likely. The greater the amount of movement detected from Rufus, the fuller



Figure 3. Example structure generated for “Moments”. In this case, 13 sections were

Musebots generated a unique structure for this movement, using moment-form [15], which determined their activity, complexity, speed, consistency, and volume.

Once a form was generated, musebots performed within the sections, influenced by each section's specific parameters. Sounds were generated by a musebot playing a varying synthesizer drone, another playing synthetic bells, a third playing the Disklavier, and a fourth playing a robotic marimba.

At the same time, an additional video musebot displayed scrolling text, drawn

the orchestration.

5.4 The Unnamable

This movement used four sections of text from Beckett's *The Unnamable*, separated by poetic movement. Three locations around the stage had microphones hung, so that Rufus' speech could be received by the musebots during stationary recitations. Live processing occurred based upon Rufus' speech intonations: the louder Rufus spoke, the more intense processing was added to the voice.

Movement analysis was also presented, so that when Rufus began to move/dance between speeches, the musebots responded with multi-layered recordings of the previously spoken text. The greater the amount of movement, the greater the number of layers, and the more extreme the processing on the recordings, which included time-stretching and pitch-transposition.

5.5 Moments

generated over a five-minute duration; sections are delimited by vertical grey lines, and parameter values for speed, activity level, voice density, complexity, consistency, and volume are displayed in black lines. Time moves from left to right.

from *The Unnamable*. The displayed text's speed and size also used the parameters from individual sections, and the second author freely interacted with the projections.



Figure 4. *The second author interacting with projected text in “Moments”.*

5.6 Buckets of Beckett

This section was the initial test, in which 11 possible texts were recorded, and musebots sliced them up and layered them in response to both movement analysis and sound analysis. Some musebots presented more continuous background material through granularisation of text recordings, while other reconstructed phrases from these same recordings. These assemblages often, but not always, reproduced actual text from the Beckett sources, and Rufus was able to react to them through vocal repetition and/or correction.

5.7 Building

Musebots generated an unfolding musical structure in two parts, for Disklavier and robotic marimba; two concurrent melodic lines were repeated: first one note, then another added, then another, until both phrases were fully revealed. Two separate video processes aligned with this

unfolding, as two video musebots selected from pre-recorded video to create a limited set of repeated movement gestures. Two additional musebots displayed an unfolding text from phrases Rufus has already spoken, as well as generating new text (using Markov chains) from Beckett’s *The Unnamable*. Rufus freely (re)interpreted the displayed movement gestures through poetic movement.

5.8 Memory

This movement served as a final summing up; Rufus mumbled previously intoned text, as if remembering half-forgotten lines, while slowly getting dressed to leave the theatre. The musebots responded with one final instantiation of musebot-manipulated spoken text, and a visual musebot faded in with slowly scrolling text taken from *Waiting for Godot*, with only the performance directions shown.

6. Summary

This collaboration set out to investigate how the author’s respective trajectories in generative art and improvisational dance/theatre might intersect. The initial collaboration was successful and satisfying, which led to their desire to create a full-length work. While the initial single-movement work did not require the consideration of how to generate time-based form – itself an open problem [16] – the final full-length work did require relying upon more traditional methods of multi-movement structures, albeit without the notion of a narrative teleological structure.

7. Acknowledgements

Unauthorized was created with the support of a Social Sciences and Humanities Research Council of Canada grant, and a School for the Contemporary

Art Faculty Research presentation grant, as well as The Listening Lab and the International Institute for Critical Studies in Improvisation. The authors wish to acknowledge the artistic contributions of Simon Overstall (video), Kyla Gardiner (lighting), and Santa Aloï and Judy Wenzel for their dramaturgy.

References

- [1] Rowe, R. (1992). *Interactive Music Systems*. MIT Press.
- [2] Behrman, D. (1978). "On the Other Ocean." record jacket notes.
- [3] Chadabe, J. (1984). "Interactive Composing: An Overview." *Computer Music Journal*. 8(1).
- [4] Lewis, G. (1999). "Interacting with latter-day musical automata." *Contemporary Music Review*. 18(3).
- [5] Eigenfeldt, A. (2007). "The Creation of Evolutionary rhythms within a Multi-Agent Networked Drum Ensemble." International Computer Music Conference, Copenhagen.
- [6] Wooldridge, M. and N. Jennings. (1995). "Intelligent Agents: Theory and Practice." *Knowledge Engineering Review* 10(2).
- [7] Bown, O., Carey, B. and Eigenfeldt, A. (2015). "Manifesto for a Musebot Ensemble: A platform for live interactive performance between multiple autonomous musical agents." Proceedings of the International Symposium of Electronic Art, Vancouver.
- [8] Eno, B. (1996). "Generative music." Transcript of talk from Imagination Conference, San Francisco, 8 June 1996. In *Motion Magazine*. Available online: <http://www.inmotionmagazine.com/eno1.html>.
- [9] Beckett, S. (2011). *Waiting for Godot*. Grove/Atlantic.
- [10] Beckett, S. (2012). *The Unnamable*. Faber & Faber.
- [11] Barthes, R. and R. Howard. (1975). *The pleasure of the text*. Macmillan.
- [12] Snowber, C. (2002). "Bodydance: Fleshing soulful inquiry through improvisation." C. Bagley & M.B. Cancienne (Eds.), *Dancing the data*. □Peter Lang.
- [13] Abram, D. (1996). *The spell of the sensuous: Perception and language in a more-than-human world*. Pantheon Books.
- [14] Eigenfeldt, A., Bizzocchi, J., Thorogood, M., and Bizzocchi, J. (2015). "Applying Valence and Arousal Values to a Unified Video, Music, and Sound Generative Multimedia Work." Generative Art Conference, Venice.
- [15] Eigenfeldt, A. (2016.) "Exploring Moment-Form in Generative Music." Sound and Music Computing Conference, Hamburg.
- [16] Eigenfeldt, A., Bown, O., Brown, A., Gifford, T. (2016) "Flexible Generation of Musical Form: Beyond Mere Generation." International Conference on Computational Creativity, Paris.