GA2015 – XVIII Generative Art Conference

Arne Eigenfeldt	**Musebots Chill-out Session: A Continuously Running Generative Music Installation** **Sound Installation**

Topic: Music

Authors:
Arne Eigenfeldt
School for the Contemporary Arts,
Simon Fraser University,
Vancouver, Canada
arne_e@sfu.ca

Oliver Bown
Faculty of Art and Design
University of New South Wales
Sydney, Australia
o.bown@unsw.edu.au

Main References:
[1] Bown, Carey, and Eigenfeldt. "Manifesto for a Musebot Ensemble", International Symposium on Electronic Art, Vancouver, 2015
[2] Eigenfeldt, Bown, Carey. "Collaborative Composition with Creative Systems: Reflections on the First Musebot Ensemble", International Conference on Computational Creativity, Park City, 2015.

Abstract:

Musebots are pieces of software that autonomously create music, collaboratively with other musebots. The goal of this project is to establish a fascinating creative platform for experimenting with musical autonomy, open to people developing cutting-edge music AI, or simply exploring the creative potential of generative processes in music. Not simply a robot jam, but individual virtual instrumentalists coming together, like a band, to autonomously create (in this case) downtempo EDM. For this European premiere of the musebot ensemble, we have contributions from Europe, Australia, and North America.

The aim of the Musebot project [1] is to establish a playful and experimental platform for research, education and making, that will stimulate interest and advance innovation in musical metacreation (MuMe). Above all the Musebot project is a collaborative, creative experiment: **we invite others in the generative music community to join us in making autonomous software agents that work *together* to make original music**. These software agents will run on a either a single computer, or network of computers, creating music together in a "musebot ensemble" for a public audience.

Each software agent corresponds roughly to a single "instrumental part" in a piece of music, like a bassline or a drumbeat. If we make these agents smart, then the resulting music will be coherent and continually evolving in interesting ways.

There has been a lot of research in MuMe systems, and the results are impressive. But a lot of the creative work is in standalone systems that compose or perform live with human improvisers. This is a daunting task and the results can be opaque. It is hard for people to share their ideas or their code, or work out ways that their systems might be incorporated into creative workflows. Musebots, by contrast, are small modular units that are designed to be shared and studied by others. By making collaboration central, the Musebot project forces us to be transparent in how our systems work [2].

Musebot home page: http://metacreation.net/musebots/

Musebot example video (screen grabs): http://metacreation.net/musebot-video/

Contact: *arne_e@sfu.ca*	*Keywords:* Generative music, electronic dance music, installation

Musebot Chill-out Session: A Continuously Running Generative Music Installation

Arne Eigenfeldt

School for the Contemporary Arts, Simon Fraser University, Vancouver, Canada

arne_e@sfu.ca

Oliver Bown

Faculty of Art and Design, University of New South Wales, Sydney, Australia

o.bown@unsw.edu.ca

Artistic Statement

Musebots are pieces of software that autonomously create music, collaboratively with other musebots. Our hope is to establish a creative platform for experimenting with musical autonomy, open to people developing cutting-edge music intelligence, or simply exploring the creative potential of generative processes in music. Not simply a robot jam, but individual virtual instrumentalists coming together, like a band, to autonomously create (in this case) downtempo EDM. For this European premiere of the musebot ensemble, we have contributions from Europe, Australia, and North America.

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References

[1] Bown, O., Carey, B., and Eigenfeldt, A. "Manifesto for a Musebot Ensemble", International Symposium on Electronic Art, Vancouver, 2015

[2] Eigenfeldt, A., Bown, O., and Carey, B. "Collaborative Composition with Creative Systems: Reflections on the First Musebot Ensemble", International Conference on Computational Creativity, Park City, 2015.

Jim Bizzocchi *et al.*	**SEASONS** ***Installation***

Multimedia Generative Art

Authors:
J. Bizzocchi[1], A. Eigenfeldt[2], M. Thorogood[1], P. Pasquier[1], M. Horrigan[2], J. Fan[1], L. Fang[1], J. Bizzocchi[1]
[1] School of Interactive Art and Technology, Simon Fraser University, Surrey, Canada
[2] School for the Contemporary Arts, Simon Fraser University, Vancouver, Canada

Main References:
[1] Bizzocchi, J. The Aesthetics of the Ambient Video Experience, Fibreculture Journal, 2008, Issue 11.
[2] Thorogood, M., Pasquier, P. "Computationally Generated Soundscapes with Audio Metaphor", ICCC, Sydney, 2013.
[3] Eigenfeldt, A. "Generative Music for Live Musicians: An Unnatural Selection", ICCC, Park City, 2015
[4] Eigenfeldt, A., Thorogood, M., Bizzocchi, J., Pasquier, P. "MediaScape: Towards a Video, Music, and Sound Metacreation", CITAR Journal 6(1), 2014

Abstract:
Seasons is an audio-visual experience that models and depicts our natural environment across the span of a year. The system comprises video sequencing and transitions enriched through their interaction with music and soundscape. The full work is a real-time cybernetic collaboration between three generative systems: video, soundscape, and music. The work runs continuously using a variety of computational processes to build the audio-visual output for a single high-definition and multi-channel sound system.

The generative video sequencing engine uses a recombinant process to combine and sequence shots and transitions drawn from the system's databases. It runs indefinitely, and very seldom repeats its sequencing. The video engine uses metadata tags to provide semantic coherence to the ongoing stream of images and sequences. The aesthetic is that of "ambient video"[1], gently inviting the viewer to enter an experience of sensory engagement with our natural environment.

Each video clip also has been hand-tagged with a subjective measure for valence and arousal: these values, combined with the video's metadata, are sent to the soundscape [2] and music systems [3], which generate appropriate accompanying material. The soundscape engine, *Audio Metaphor*, uses techniques from natural language processing, machine learning, and cognitive modelling to autonomously create an ambient soundscape from metadata tags. The music engine, *PAT*, creates melodic, harmonic, and rhythmic material attained through machine-learning from a corpus.

The team includes individuals with expertise in moving images, film, music composition, performance, installation, machine learning, sound art, software development, and multi-agent systems. Applying sound and music analysis and generative concepts to video, and vice-versa offers a rich opportunity for innovation in generative art and technology.

Many examples of generative works in sound, music or video exist, but we have found very few that combine these into a system where the elements interact and generate a blended audio-visual work in real-time. An earlier version of the work, *Mediascape*, has been documented [4].

Link for sample video
Seasons is a work in progress at the time of this submission. Two early examples can be found here:

https://vimeo.com/136362499

https://vimeo.com/136361163

Contact: ***Justine Bizzocchi,*** ***jbizzocchi@shaw.ca***	**Keywords:** generative video, generative soundscape, generative music, multimedia

Seasons: A multimedia generative artwork

Jim Bizzocchi[1],
email: jimbiz@sfu.ca

Arne Eigenfeldt[2], Miles Thorogood[3], Philippe Pasquier[1], Matt Horrigan[2], Jianyu Fan[1], Le Fang[1], Justine Bizzocchi[1]

[1] *School of Interactive Art and Technology, Simon Fraser University, Surrey, Canada*
[2] *School for the Contemporary Arts, Simon Fraser University, Vancouver, Canada*
[3] *Faculty of Creative and Critical Studies, University of British Columbia, Kelowna, Canada*

Artist Statement

Seasons is a meditation on our natural environment, inviting viewers to savor the passing of time over the course of a year. The system comprises video sequencing and transitions enriched through their interaction with music and soundscape. The full work is a real-time and ongoing cybernetic collaboration between three independent but communicating generative systems: video, soundscape, and music. The work runs continuously using a variety of computational processes to build the audio-visual output for a single large-screen display and 8-channel surround sound system.

Computational generative artists strive to instantiate the dynamics of artistic practice within the structure of code and algorithm. The creative team behind *Seasons* have been working independently for many years within separate generative art domains (video, music composition, sound art). Within their respective specialties they have developed generative work as a means to further their artistic goals. They have now come together to explore their shared ideas within an interdisciplinary context.   Their common goal is to understand how generative methods can be applied to the aesthetic challenges and opportunities within multimediated works of audiovisual art.

1. Visuals

Seasons is conceived as an example of "Ambient Video". Bizzocchi has been exploring and working within this form for over a decade. He has been inspired by Brian Eno's description of ambient music, which "must be able to accommodate many levels of listening attention without enforcing one in particular; it must be as ignorable as it is interesting."[1] Bizzocchi's "ambient video" art is designed not to require viewer attention, but rather to reward viewer attention whenever it occurs. Bizzocchi sees this form of video art as an appropriate medium to communicate his deep love for natural places, and an effective expression for his deep love of visual pleasure and cinematic flow. In these works, he applied three creative tactics:

- gathering high-definition moving images imbued with filmic expressivity of visual composition, cinematic patterns and textures, and the ongoing play of color, light and shadow;
- treating time as plastic - slowing the editing pace through extended shot times and manipulating the time base within the shots to slow down certain features (such as water flow) or speed up other features (such as clouds floating across the sky)
- building a complex aesthetic of visual layering and complex shot transition to both confound our sense the "real" and to push back against the traditional cinematic norm of simple hard cuts

His linear videos were relatively short pieces - ranging from 8 minutes to 20 minutes in length. Bizzocchi began exploring generative methods in order to build a system that would create an ongoing ambient video

flow that never stopped, yet always presented varying visual connections and sequences. His first generative work *Re:Cycle* used simple rules for sequencing shots and incorporating algorithmic visual transitions to approximate the aesthetics of his linear video art. With *Seasons*, he has incorporated more sophisticated sequencing rules to increase visual coherence, and refined the transition strategies to maximize visual flow. He is also excited to collaborate with his colleagues to develop tactics that incorporate the power of music and soundscape with the visual expressivity of the video.

Bizzocchi has written in more detail about his ongoing exploration of Ambient Video in many articles [2] and completed five works in this style. His website (http://www.ambientvideo.ca) links to articles and includes sample videos.

2. Music

The music in *Seasons* is generated by an ensemble of musical agents, called musebots. A musebots is a "piece of software that autonomously creates music collaboratively with other musebots".[3] Within *Seasons*, fourteen different musebots are combined into eight different ensembles, which rotate with each subsequent season, and are launched and coordinated by a Conductor. Musebots are designed to generate and manage specific musical functions; for each, one musebot generates a harmonic progression based upon the incoming arousal and valence values, and transmits this to other active musebots. Other musebots may generate rhythmic material, while others generate harmonic material (based upon the progression generated by the harmony generator). Musebots transmit their states, as well as their intentions, allowing other musebots to coordinate their musical actions.

The ambient aesthetic within *Seasons* suggests slower tempi; therefore, each ensemble ranges from 40 to 60 beats per minute. Several musebots create longer sustained textures (named "Chord", "BassDrone", "Drone", "Texture", "Pad"), while others generate more rhythmic elements (named "Figurate8", "Figurate16", "Mallets", "Ostinati", "Tinkle"). One musebot uses a corpus of machine-learned melodies derived from Pat Metheny ("MethenyMelodies"), while another uses instrumental samples and embellishes neighbor tone melodies ("Neighbor").

Musebots use sample-based audio generation and synthesis, including granular synthesis. Many of the samples are utilitarian (for example, "Harp", "Electric Piano", "Celesta"), while others are quite evocative on their own (for example, "Chord" uses "Bowed Guitar" and "Bowed Vibe" samples).

While the musebots are autonomous, they were designed by a composer, and "inherited" the composer's musical aesthetic. This is, perhaps, most clearly reflected not only in the types of musebot designed, but also curated into the ensembles for *Seasons.* Eigenfeldt has created over three dozen musebots that function in a variety of styles; however, most of those used within *Seasons* were created specifically for the work.

3. Soundscape

Thorogood and Pasquier developed the Audio Metaphor system [4] to generate live performances of soundscape composition. The system is designed to utilize natural language cues combined with audio analysis, segmentation and recombination to create evocative sound art performances. In its initial implementation, the system took its cues from Twitter comments and searched online audio clips for source sound material.

For *Seasons*, the inputs to the system derive from metatags manually assigned to each video clip and access to an audio clip database which has been curated to support the Ambient Video aesthetic. Initially, the tags used were often the same as the tags used by the Re:Cycle engine to select and sequence the

video. This was an attempt to select source material that correlated closely to the content of the videos (lakes, forests, snowy mountains). However, it became clear that some of the audio sources returned sound that did not reflect the pleasant and calm aesthetic sought. This is due mainly to the unregulated tagging system (text added by those who contributed sound clips). Furthermore, some of the video tags were more visually oriented and would not often be used to describe sound clips. One solution we adopted for the first installation of the work in August 2015 was to adjust the settings in the system that composes the soundscape clip to create a less representational or natural soundscape in favour of a more abstract but evocative track.

Additional methods have also now been implemented. In the first case, a system to identify and eliminate certain sound clips from the database used by the system for *Seasons* has been implemented. For the second issue, a separate set of text cues for the sound was created. These help to differentiate between two shots that contain similar elements, but convey different environments. For example one shot of a lake or stream might be very calm and quiet, while another displays pounding waves. Finally, settings in the system that composes the soundscape clip were adjusted to create a less representational or natural soundscape.

4. Installation

The ideal setting for *Seasons* is in a separate space which allows viewers to take the time to absorb the slow pace of the video and fully enjoy the multi-layered sound track. This is not always possible in a gallery situation, particularly with respect to the sound. In such cases the work may be displayed by video projection or on a large high-definition monitor, with headphones provided for listening.

Sample video can be viewed here:
> https://vimeo.com/136362499
> https://vimeo.com/136361163

References

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