QUIET INVOCATION: AN INTERACTIVE SOUND COMPOSITION

by

Alexander William Dobson
BMus, Capilano University, 2013

A Project Report Submitted in Partial Fulfillment of the Requirement for the Degree of

MASTER OF MUSIC

In the School of Music

Supervisory Committee

QUIET INVOCATION: AN INTERACTIVE SOUND COMPOSITION

by

Alexander William Dobson
BMus, Capilano University, 2013

Supervisory Committee

Prof. Kirk McNally, Supervisor
Department of Music

Prof. Paul Walde, Outside Member
Department of Visual Arts

Abstract

Interactivity in music can be an effective tool for capturing an audience's imagination and inserting them into a world of the composer's making. Movement and space can also be incorporated into the composition, as seen in music written for dance, or explored more abstractly in fields such as sound installation. While interactivity and participation can be effective in a live setting, broad sections of society experiencing social isolation from personal or external circumstances may desire a similar form of connection in the digital realm - the COVID-19 pandemic has made this very clear. This MMus project puts audience participation in the foreground by bringing the composition *Quiet Invocation* into the user's home. Using simple kinetic feedback from the user, I am able to produce a novel sound experience that changes along with the participant's actions and perspective. This was achieved using the audio-visual programming language MaxMSP to analyze the user's environment through the webcam on their laptop computer. This input information can then be used to dynamically effect the musical and spatial parameters of the piece, which is reproduced using a simple set of stereo loudspeakers or headphones. *Quiet Invocation* presents an engaging sound experience that uses the depth and spatial potential of stereo technology to place listeners in a shifting sound world that responds to their movement. At the same time, the composition has been adapted for users experiencing hearing-loss so that the relationship of different musical textures can take precedent over spatial cues that rely on non-impaired hearing. This format can be freely disseminated online and reproduced using home computers, presenting a powerful example of accessible art.

Table of Contents

Supervisory Committee....ii
Abstract....iii
Table of Contents....iv
List of Figures....v
List of Tables....vi

1. Introduction/Background....1
2. Artistic Statement....2
    2.1 Intent....2
    2.2 Attention and Movement....2
    2.3 Sound Objects and Texture....3
3. Method/Analysis....4
4. Discussion/Results....8
    4.1 Similar Works....8
    4.2 Informal Survey and Critique....9
5. Conclusion....11
    5.1 Future Works....11
    5.2 Final Reflections....12

Bibliography....13
Works Referenced....15
Appendix....16
    Downloading and Accessing “Quiet Invocation”....16

List of Figures

Figure A - Webcam Feed.....4
Figure B - Diagram of Webcam Axes with Sound Parameters.....6
Figure C - User Interface.....7
Figure D - Programming Layer.....7

List of Tables

Table A - Survey Results..........10

1. Introduction/Background

Interactivity in music can be an effective tool for capturing an audience's imagination and inserting them into a world of the composer's making. This is evident from early childhood - where a child's focus and attention can be sought through sing-a-longs - and is mirrored later in life with the familiar practice of call-and-response vocals found in many forms of popular music. Movement and space can also be incorporated into the composition, as seen in music written for dance, or explored more abstractly in fields such as sound installation. Each of these practices produces a novel effect for the audience, making them an active participant in the piece rather than a dutiful listener and observer. While interactivity and participation can be effective in a live setting, broad sections of society experiencing social isolation from personal or external circumstances may desire a similar form of connection in the digital realm - the COVID-19 pandemic has made this very clear.

This MMus project place audience participation in the foreground by bringing the interactive composition *Quiet Invocation* into the user's home. Using simple kinetic feedback from the user, I am able to produce a novel sound experience that changes along with the participant's actions and perspective. This was achieved using the audio-visual programming language MaxMSP to analyze the user's environment through the webcam on their laptop computer. The input information can then be used to dynamically effect the musical and spatial parameters of the piece, which is reproduced using a simple set of stereo loudspeakers or headphones. Stereo audio uses human perception to produce expansive left-to-right, front-to-back sound spaces. This allows listeners to enter sonic compositions where elements move fluidly in depth and direction. Multi-disciplinary research is required to address the practical and artistic challenge of producing an effective sound composition in an uncontrolled space.

The field of electroacoustic sound composition offers a wealth of academic resources regarding audience-participation and interactivity in music. Research on how compositions for loud speakers can effectively engage audiences without typical visual performance cues (MacDonald, 1995) and research on the challenges of using live feedback during performances (Jensen 2009; Rubidge and MacDonald, 2010) are of particular interest. The home setting and digital dissemination of this piece produces some inherent accessibility implications, which I have tried to intentionally embody in the work using previous debate and reflections on accessibility in gallery curation (Cachia, 2019; Lisney et al. 2019). Research presented as a creative artefact also presents challenges in setting goals for self-criticism on what is ultimately a subjective product - Linda Candy's (2006) writing on *Practice Based Research* has proved helpful in this regard.

Quiet Invocation provides an engaging sound experience that uses the depth and spatial potential of stereo technology to place listeners in a shifting sound world that responds to their movement. At the same time, the composition has been adapted for users with hearing-loss so that the relationship of different musical textures can take precedent over spatial cues that rely on non-impaired hearing. This format can be freely disseminated online and reproduced using home computers, presenting a powerful example of interactive art.

2. Artistic Statement

2.1 Intent

This composition is an exercise in the exploration of sonic texture, employing a largely formless and through-composed strategy that derives its "form" not from specific musical gesture but from the user's individual interaction. The experience begins and ends with the listener's attention, harnessing their unique focus to produce movement and punctuation to the static musical texture, a process that is stationary and dynamic all at once. The listener is placed inside of a soundscape that can be observed from several angles: rhythm, space, trajectory, conversation, and movement.

The multi-dimensional sound field forms new options for composition that produce attention and interest outside of traditional musical forms – the foundation can be droning and abstract, seemingly without purpose, while a sense of shape and exposition is created via the movement and engagement of sound within one's own physical space. The subjective world of the listener becomes the composition itself, rendering no two instances the same. This style of composition is grounded in non-fixed composition, and finds inspiration in the democratization efforts of composers like John Cage, who often challenged the roles of audience and performer. This is exemplified in the infamous work *4'33"* which directs any combination of musicians and instruments to perform the score by setting a timer and sitting silently at their posts for the length of the composition, allowing the audience to engage with the natural soundscape that arises from conscious and focused listening.

2.2 Attention and Movement

The conceptual basis of this sound composition owes heavily to Alistair MacDonald's (1995) writings on the performance practice of Electroacoustic music where, through his own practice, he has attempted to define the possibilities and challenges of creating a "performance" out of electronic compositions played over loudspeakers. In particular, MacDonald emphasizes the importance of manipulating acoustic space and its apparent importance to the listener as a perceptual cue:

> Not only does the control and composition of landscape open up large new areas of artistic exploration and expression, in the sphere of electroacoustic music, [but] it will enter into the listener's perception of a work regardless of the composer's indifference to it. (90)

Without being able to rely on the physical placement of speakers for this work, I have opted to use perceptual cues relating to physical space. MacDonald addresses these as a major point of interest, explaining that:

> sounds at extreme left and right positions suggest dialogue or opposition. And the distinction between 'present' and 'distant' suggest levels of engagement from participation to observation as do a sense of envelopment as opposed to a

single point source" (91).

He further defines the preferred parameters of control for an electroacoustic performance as "volume; spatial dimensions; spatial location; depth; height; motion/spatial behaviour; distance & presence (related to a perceived notion of observation versus engagement); reverberation (of the performance space)" (92).

2.3 Sound Objects and Texture

While MacDonald provides a basis for the technical parameters of this composition, I have explored the writing of electroacoustic musician Denis Smalley (1997) as he attempts to define a sonic language of electro-acoustics in order to "discover stability in a wide-open sound world" (107). This exploration of sound composition provides a more firm basis for the textural explorations in the piece and how they may produce an emotional and spatial effect in a listener who does not possess spatial stereo hearing. Smalley makes a compelling statement about the process of abstracting sound language here:

> There is quite a difference in identification level between a statement which says of a texture, 'It is stones falling', 'It sounds like stones falling', 'It sounds as if it's behaving like falling stones'. All three statements are extrinsic connections but in increasing stages of uncertainty and remoteness from reality. If a listener, elaborating on either statements two or three, comments on qualities and features of the texture as heard within the musical context, then attention turns away from the primarily extrinsic towards special intrinsic features and therefore moves more deeply into the particular bonding musical experience. (110)

This "particular bonding musical experience" is exactly what I seek to explore in the composition of this interactive composition. By combining the innate physicality of stereo sound reproduction with a subjective exploration of sound texture and quality, the listener can be engaged on several levels that are not mutually reliant upon each-other to create a personalized and moving experience.

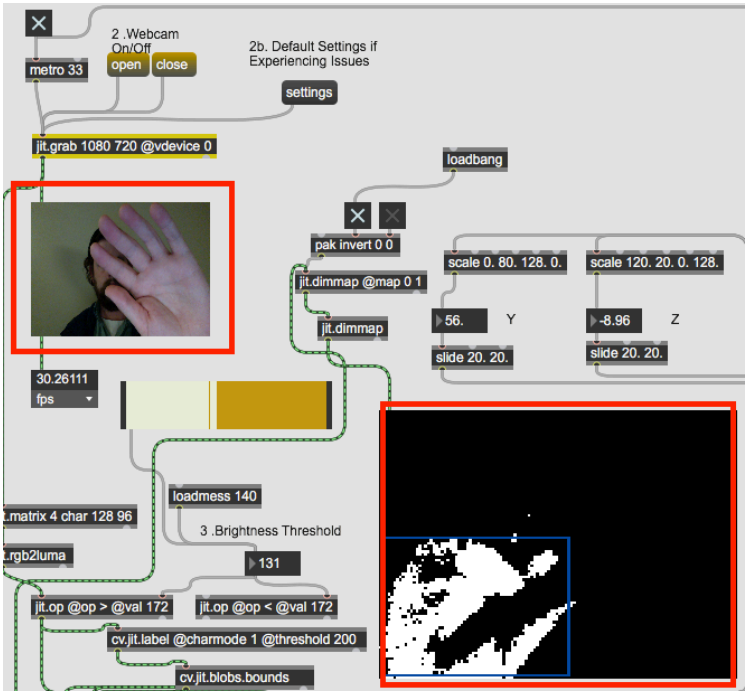
3. Method/Analysis

To explore audience participation in an uncontrolled, digital environment requires a strong conceptual and theoretical basis. As I have outlined in my artistic statement, an essential part of the composition of this piece comes from the listener's attention and movement. This, by nature, produces a level of engagement that moves the audience out of the realm of focused music listening and into an installation-like environment through their intentional participation. By using interactive elements, the project seeks to include the audience as an essential piece of the work of art. No two performances can be the same, both in the way that the listener relates to the interactivity and in the way that the listener's environment influences the musical data, creating an experience that is entirely unique to the audience.

To begin developing the application, I needed to define the tools available to me. It was further necessary to keep things as simple as possible to reach the goal of accessibility. I limited myself to the use of a laptop with a webcam to provide a medium for visual feedback and audience participation. I also determined that the audio elements should be considered satisfactory via any available playback method including low-cost earbuds or laptop speakers. For the method of delivery, I explored the capabilities of MaxMSP to translate visual analysis into data.

An item-pack developed by media artist Jean-Marc Pelletier called Computer Vision for Jitter (cv.jit) provided detailed processing of video material. By taking the colour webcam feed and reducing the available information to a black-and-white pixel grid (**Figure A, highlighted in red**), it was possible to identify contrasting masses in the video. I was then able to track these objects with X/Y coordinates, outputting data values that can easily be scaled into inputs for various musical parameters. Through civ.jit, the area of the object can also be given, creating a Z dimension based on the size of the object. When a single object is in focus, a larger object is closer to the webcam while a smaller object is further away.

Figure A - Webcam Feed



With this method of parsing the visual information from the webcam, I sought to first connect left-to-right webcam movement to the similarly left-to-right stereo sound space of the composition. I discovered in my training as an audio engineer that stereo panning is one of the primary methods of organizing sound during post-production, and should thus be familiar to most listeners. MacDonald's writings (1995) also explicitly reference that the extremes of the left-right axis represents conversation and duality (91), which supported my instincts and provided a conceptual and compositional basis for the use of this movement.

The X-axis location of the largest identified object in the video was connected to the stereo balance of audio material. This strategy provided a basis for extracting values from the remaining axes. The initial data output was relatively unstable and required finer tuning of the object detection parameters in the video. A reduction in the amount of detectable objects helped. Additionally, an input lag was added to eliminate abrupt shifts in x/y/z values that occur due to quick movement or detection error.

Some immediate questions arose regarding the best use of these values. Insistence on left/right distinction in the stereo field provides a potential obstacle for those experiencing hearing-loss. Volume and intensity also come to mind as an intuitive audio effect, but, given the availability of both an Y and Z axis, these attributes could either be associated with "closeness" or "height". The Z axis also provides some confusion as a 3rd dimension of physical space in a more dimensionally-limited sound field. With a more complicated data-set, more complications are apparent in the implementation of a meaningful experience for the end-user.

I sought to simplify and solve these problems within the composition itself, isolating three primary musical textures (harmony, melody, and atmosphere) which were each connected to one axis of the webcam read-out. Each musical texture consists of two complimenting/contrasting iterations, which continuously fade between each-other based on the axis positioning (i.e., blended in the centre, isolated to either end). With this macro scale, I made use of the implied physical dimensions of the 3 axes to associate a literal change in the sound space with a more figurative change in style and texture. For those with hearing-loss or those using low-quality equipment that fails to capture the full stereo field, the musical and metaphorical change reinforces the physical dimensions of each axis without relying on an equivalent movement in the stereo space.

These considerations draw directly from the research I touched upon in the artistic statement. By relying on contrasts in the macro texture of the composition, the sonic landscape is persistently engaged in layers of dialogue and contrast that relate back to the major parameters of control that MacDonald (1995) has identified in his works. The Z-axis was defined with "closeness" and "distance" (which MacDonald also identifies as "observation" and "engagement"), and provides a strong conceptual basis for the installation as the two layers fluctuate paradoxically between contrast and compliment.

In one layer the field recording captures a campfire that is followed by a drum circle. This layer evokes engagement as the crackling flame shatters the silent night, and the friendly cacophony of the percussion group echoes off the nearby buildings. At the same time, the flame feels intimate and meditative, the kind of space where friends would gather to sit in contemplative silence, rendering an environment of closeness to the source of activity but distance from community. Similarly, the vibrant music and warm farewells of the tight-knit drum circle are nonetheless separated by the distance captured in the echoing cacophony of the drums and the members' shouted words. The contrasting layer captures a more open and detached environment, filled with the singing of birds on a breezy day, followed by the downpour of a rainstorm. The listener becomes a quiet observer, enveloped by the droning white noise of the outside world.

The remaining parameters relate more simply to the musical content. The Y-axis was defined both with "height" and "intensity": the melodic voice rises in octave with greater values, but also takes up more of the sound space with echoing delays and reverb. The "intensity" of the reverberant space creates a dual-effect as the echoes imply distance and reinforce physical height as the melody seems to move to a different plane. The X-axis was defined the most literally as the two contrasting harmonic voices (sustained piano and pointillistic strings) are panned opposite to the left and right. As the x-value changes, the texture on one side becomes washed out and distant as the texture on the other side becomes more intimate and well-defined, providing a clear musical change in absence of strong stereo identification. A conceptual diagram of the webcam information along with the fully implemented patch are visible in **Figures B, C and D**.

Figure B - Diagram of Webcam Axes with Sound Parameters

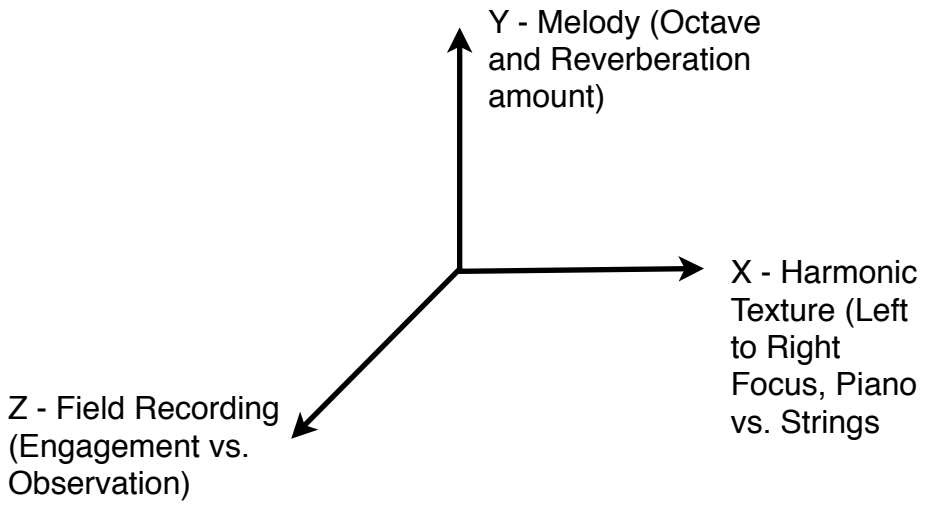
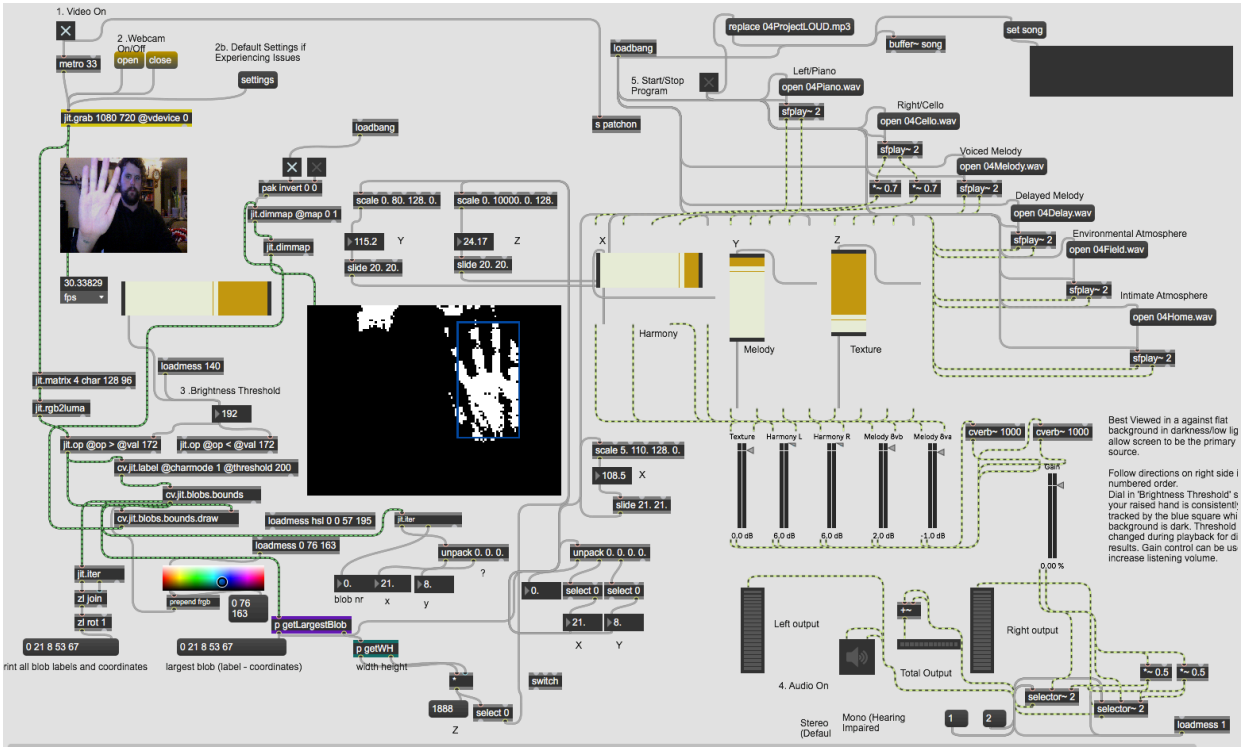


Figure C - User Interface

Figure D - Programming Layer



4. Discussion/Results

4.1 Similar Works

It was helpful to explore related works by electroacoustic composers and sound installation artists to help meaningfully self-criticize the success of the work. I sought out works that focused on video feedback and audience movement which had been presented in academic institutions and thus has supporting research. Brown Professor Todd Winkler has made consistent use of interactivity and video analysis of audience-participants to influence his audio installation works, most notably his 1997 work *Light Around the Edges*. Winkler (2000) identifies key aspects of the artistic philosophy to this approach that relate to my own artistic goals and the practical application of this piece:

> The players are not only the musicians playing the music, they are the dancers in their own dance. In other words, the players are the content of the work … The installation sets the stage for this event to occur, but this particular realization only exists because of this particular performance … Participants are asked to become artistic collaborators, performers and, finally, content in a digitally mediated work. (4)

There is a strong correlation here between the preliminary research, my artistic intentions, and Winkler's observations. The transmutation of the participant/performer into the actual content of work creates it's own aesthetic value. Rather than realizing an independent and complete composition, the sonic world of the composition is made new by this interactive aesthetic with each new participant and performance. Winkler also touches on an essential goal of the project, which is the development of a form of musical media that relies on the interaction of digital and non-digital forms: "As sensing technology matures, artists will be compelled to conceive of work where physical interaction, computer interaction, and social interaction are vital to creating new forms of expression and experience" (5). This newly imagined format of expression necessarily creates an inclusive and accessible art space for anyone with access to the digital technology.

Winkler's research finds echoes in further works by Alistair MacDonald and Sarah Rubidge, who presented their collaborative electroacoustic/dance piece *Sensuous Geographies* for the academic journal *Digital Creativity*. With the piece, the authors directly reference their attempts to "facilitate collaborative interactivity between participants and bring about emergent choreography" (2010, 245). One of the more interesting aspects of *Quiet Invocation* comes from the reflection of the participant in the viewing space of the application (**Figure B)**, encouraging another layer of interactivity as the viewer may gesture not just musically but with a personal choreography. With each of these artists, the presenter initiates a set of rules and a technological method to realize certain outcomes, but the work that is created with each new audience member is as individual as the person.

4.2 Informal Survey and Critique

Placing *Quiet Invocation* in the context of contemporary works was a helpful framing mechanism, but given that the basis of the research is a creative artefact rather than a research document I wanted to audit the work through more objective means. Linda Candy (2006) touches on exactly this kind of work and self-criticism in her guide on "practice-based research", where she states that though "the significance and context of the claims are described in words, a full understanding can only be obtained with direct reference to the outcomes" (3). To measure the success of the work through this lens, the design and composition of the piece was better shaped through public critique of the application.

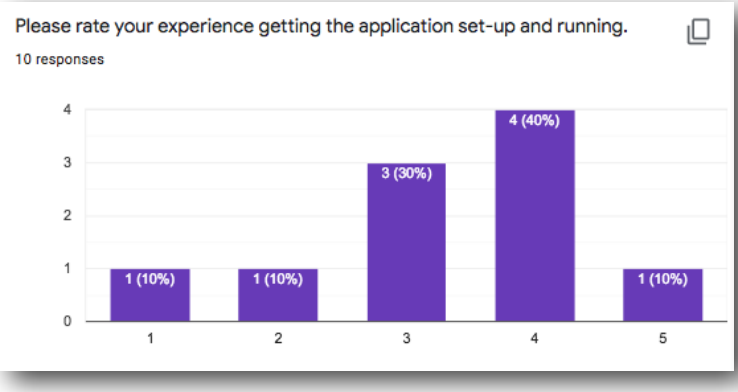
Informal feedback was sought from family and friends. This was later supplemented with a demonstration at the AUDIO+ 2021 workshop at the University of Victoria, which is described by organizers Kirk McNally and Amandine Pras (2021):

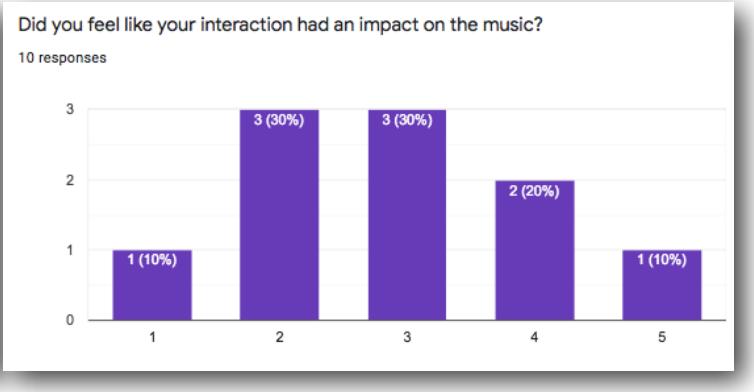
> Audio+ engages students, researchers, and industry professionals in a critical dialogue on music production cultures, innovative technologies, and the pressing need for increased equity, diversity and inclusion in our field.

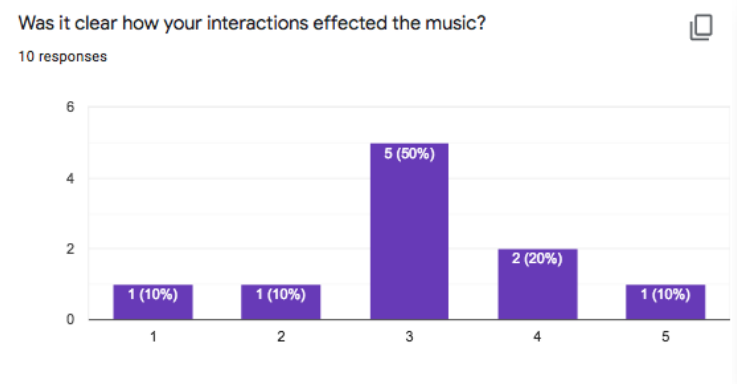
This environment allowed me to fulfill an essential criteria of practice-based research: presenting it "in a form that is accessible to and auditable by knowledgeable peers" (Candy 2006). In total, 10 participants volunteered to attempt the use of the application without any additional guidance in order to gauge its efficacy in uncontrolled and unmonitored listening environments. The participants then answered a short survey rating the quality of different aspects of the piece, with the opportunity to provide additional comments for each prompt.

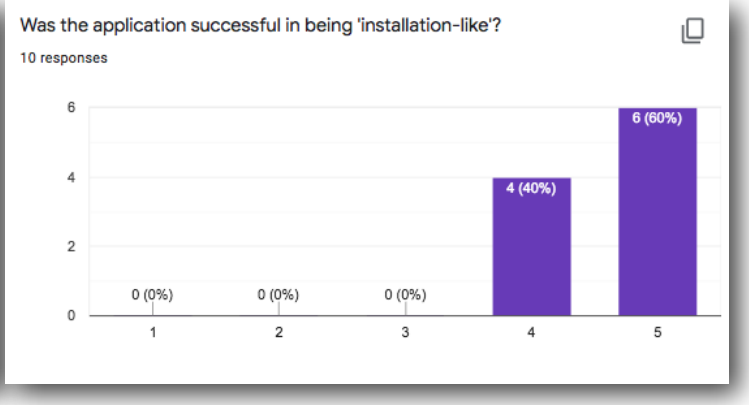
The results of the survey (**Table A**) were promising and produced several valuable observations. Most of the responses regarding the general use and quality of the composition were positive, with statements focusing on potential improvements to what was already included in the application. Some novel ideas were also introduced that may provide the basis for future works, such as including colour and shade responses in the graphic readout of the webcam, expanding the tracking to include the entire body, or options to hear individual voices and textures in the arrangement. The most consistent criticism that shaped my development of the application was a desire for a clearer connection between the movement of the performer/ participant and the effect that it has on the piece. Several respondents were able to notice a subtle effect, but desired more agency.

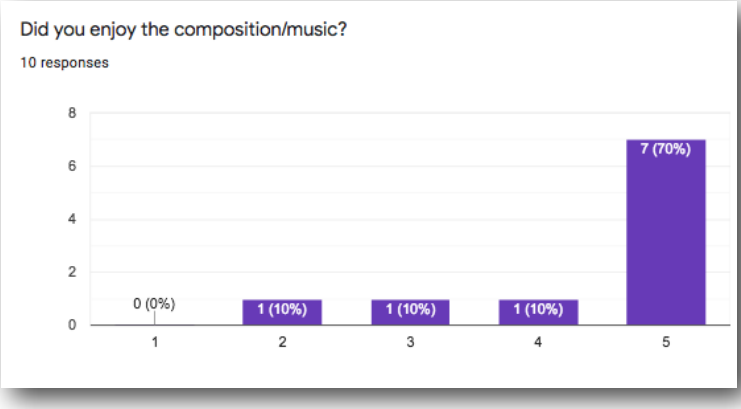
Table A - Survey Results











5. Conclusions

5.1 Future Works

Using these reference points of genre-setting and public criticism, *Quiet Invocation* represents an easily expandable form that contributes to existing research regarding interactivity in digital sound compositions. Drawing from my experience with the application's development and the feedback of friends and colleagues, some further research ideas present themselves. Since audience participation is a major aspect of the piece, a clear route of development lies in the consideration of interactivity as part of the visual aesthetic of the application itself. As a musician and student of Music Technology, my major concern with this piece was its sonic character and the effect of a participant's movement on the composition. This included a visual element to accurately demonstrate to the participant how their interaction was received through the application, but in a very basic form.

The visualization of the audience's webcam and the way it is reflected in the music can be expanded. First and foremost, the pixelated, black-and-white video feed presented to the user could be made much more engaging and visually pleasing, even if that remains the underlying mechanism of tracking and identification. I identified in Chapter 3 that an input lag was added to the digital read-out of the tracking information; this could be represented as a visual delay in movement to more clearly mark the effect of the user on the piece. The webcam feed could also include a visual representation of those textures or parameters that are being effected at a given time. The webcam tracking also relies on movement being captured close to the screen, making the movements of the participant necessarily limited.

If the tracking capabilities of the webcam were expanded to include the entire body, then the sonic potential of the music would be inherently expanded as well. The movement between extremes of the X/Y/Z dimensions affecting the musical textures could be expressed on a more fluid and granular scale, while the performance and aesthetic quality of the audience interaction would become more intuitive and expressive in the fullness of the body. This expansion of physical dimensions also presents the opportunity to expand sonic space. The information from the Y and Z axes add literal physical dimensions that could be linked to sound space using binaural processing, which produces the perception of 3-dimensional height and depth over stereo headphones.

Musically, the minimal nature of this piece may influence the style of participation from the audience. Different compositional methods might induce different movements and thus a wholly new visual aesthetic and interactive approach. One can imagine that a dissonant and rhythmically active piece might encourage more phrenetic movement from the participant and more chaotic changes in sound. Alternatively, an electroacoustic piece that explores spectral sounds and texture rather than harmony and melody could produce a completely different effect, exploring audience participation when the audience is reacting to "non-musical" sounds.

5.2 Final Reflections

The interactive, immediate sound art that is expressed in the previous works which inspired *Quiet Invocation* show great promise as an emergent genre of digital music composition. By conceptually centring the piece around the challenges and lessons of existing works, the piece learns from and expands upon the current academic research. The participation of the audience in the performance and experience of the music moves the piece away from the stratified sphere of devoted listener and innovating composer to a cooperative space where art exists in common. *Quiet Invocation* seeks to expand that natural tendency toward inclusivity and democratization of interactive composition by making explicit use of digital space to include the broadest possible audience in the broadest array of locations.

These ideas scratch the surface of a broadening focus of artistic research, which brings the remote, intimidating and uninviting realm of personal creativity into the homes and hearts of a much wider group of society with varying levels of expertise. This inclusion casts a wide net and brings the creative powers of many whose voices and input may not otherwise be heard into the fold. A new relationship is formed between artist, performer, and audience. As John Cage put it, “composing’s one thing, performing’s another, listening’s a third. What can they have to do with each other?”

Bibliography

Cachia, Amanda. 2019. “Reflections on Access: Disability in Curatorial Practice.” *Canadian Journal of Disability Studies* 8, no. 1 (February): 98-117. Accessed November 26, 2020. https://doi.org/10.15353/cjds.v8i1

Camurri, Antonio, Giovanni De Poli, Anders Friberg, Marc Leman, and Gualtiero Volpe. 2005. “The MEGA Project: Analysis and Synthesis of Multisensory Expressive Gesture in Performing Arts Applications.” *Journal of New Music Research* 34, no. 1 (March): 5–21. Accessed October 21, 2020. https://doi.org/10.1080/09298210500123895

Candy, Linda. 2006. “Practice Based Research: A Guide.” *CCS Report: 2006-V1.0 (*November): University of Technology Sydney

Dean, Roger T. 2011. *The Oxford handbook of computer music*. Oxford; New York: Oxford University Press.

Emmerson, Simon, and Leigh Landy, eds. 2016. *Expanding the Horizon of Electroacoustic Music Analysis*. Cambridge: Cambridge University Press.

Jensen, Nathan. 2009. "Choice and Consequence." Order No. 1481619, California State University, Long Beach. http://search.proquest.com.ezproxy.library.uvic.ca/docview/305179134?accountid=14846

Lisney, Eleanor & Bowen, Jonathan & Hearn, Kirsten & Zedda, Maria. 2013. “Museums and Technology: Being Inclusive Helps Accessibility for All”. *Curator: The Museum Journal* 56, no. 3 (July): 353-361. Accessed November 26, 2020. https://doi.org/10.1111/cura.12034

MacDonald, Alistair. 1995. "Performance Practice in the Presentation of Electroacoustic Music." *Computer Music Journal* 19, No. 4: 88-92. Accessed October 21, 2020. https://www.jstor.org/stable/3680993

McNally, Kirk and Amandine Pras. 2021. “Audio+: A Research Forum to Transform our Traditions.” Presented at the AES International Conference on Audio Education, Online, July 2021.

Pelletier, Jean-Marc, “Computer Vision for Jitter.” Accessed February 25, 2022. https://jmpelletier.com/cvjit/

Rubidge, Sarah and Alistair MacDonald. 2010. “Sensuous Geographies: a multi-user interactive/responsive installation.” *Digital Creativity* 15, Issue 4 (July 30): 245-252. Accessed October 21, 2020. https://doi.org/10.1080/1462626048520186

Rumsey, Francis. 2001. *Spatial Audio*. Oxford: Focal Press.

Smalley, Denis. 1997. “Spectromorphology: Explaining Sound-Shapes.” *Organised Sound* 2, No. 2 (August): 107-126. Accessed October 21, 2020. https://doi-org.ezproxy.library.uvic.ca/10.1017/S1355771897009059

Souza, Leandro, and Sergio Freire Garcia. 2018. “Towards an Interactive Tool for Music and Dance: Gestures, Laban Movement Analysis and Spectromorphology.” *Revista Música Hodie* 18, No. 1 (June 19): 117-131. Accessed October 21, 2020. https://doi.org/10.5216/mh.v18i1.53576

Van Saaze, Vivian. 2013. *Installation Art and the Museum: Presentation and Conservation of Changing Artworks*. Amsterdam University Press.

Winkler, Todd. 2000. "Audience Participation and Response in Movement-Sensing Installations." Presented at the International Symposium on Electronic Art (ISEA) Paris, France, December 2000.

Winkler, Todd. 2001. *Composing interactive music: techniques and ideas using Max*. Cambridge, MA; London: MIT Press.

Works Referenced

Cage, John. *4'33*. 1952.

Rubidge, Sarah and Alistair MacDonald. *Sensuous Geographies*. 2003.

Winkler, Todd. *Light Around The Edges*. 1997

Appendix

Downloading and Accessing "Quiet Invocation"

1. Follow the download link for your operating system:

Mac OS

https://alexdobsonmusic.files.wordpress.com/2022/04/quietinvocationmacosx.zip

Windows

https://alexdobsonmusic.files.wordpress.com/2022/04/quietinvocationpc.zip

2. Unzip files to desired location.

3. If using Mac OS, follow the steps in the included readme file to bypass security filters (Certain MacOS versions don't allow files from independent developers by default)

4. Open "Quiet Invocation" executable and follow steps in app.

    4a. If having difficulties opening app in PC, try right-clicking the executable and selecting "Run as Administrator."

    4b. If having difficulties opening app in MacOS, trying right-clicking the executable and selecting "Open" instead of double-clicking.

NOTE 1: Best functionality is achieved in a dark room against a flat wall, so that the light of your screen provides the primary illumination

NOTE 2: This app is designed for a laptop with a built-in webcam, alternate set-ups may experience difficulty. If using an external webcam you may need to do additional troubleshooting and download additional drivers, here's a start...

Mac OSX test/drivers: http://webcam-osx.sourceforge.net/

Windows Troubleshooting: https://support.microsoft.com/en-us/windows/camera-doesn-t-work-in-windows-32adb016-b29c-a928-0073-53d31da0dad5