

COMPOSITIONAL APPROACHES WITHIN NEW MEDIA PARADIGMS

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Compositional Approaches to New Media Paradigms is the discursive accompaniment to the original composition *BoMoH*, a new media chamber opera. A variety of new media concepts and practices are discussed in relation to their use as a contemporary compositional methodology for computer musicians and digital content producers. This dissertation aligns relevant discourse with a variety of concepts as they influence and affect the compositional process. This dissertation does not propose a new working method; rather it draws attention to a contemporary interdisciplinary practice that facilitates new possibilities for engagement and aesthetics in digital art/music. Finally, in demonstrating a selection of the design principles, from a variety of new media theories of interest, in compositional structure and concept, it is my hope to provide composers and computer musicians with a tested resource that will function as a helpful set of working guidelines for producing new media enabled art, sonic or otherwise.

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I would like to dedicate this dissertation to my wife, Amy and children Ari, and Rory. I love you all very much, all this I have done, for you.

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PART I

COMPOSITIONAL APPROACHES TO NEW MEDIA PARADIGMS

Chapter 1

Introduction

Composers and other such artists of the digital age, we may safely assume, are united in the experience of technology's effect on craft - though the embodiment of this change is surely the personal computer. From the perspective of the professional musician, desktop, laptop and hand-held computers have facilitated a single platform from which the practitioner may develop a digital rendering of a notated score or a performance recording. Music pedagogy has also benefitted from computer assistance: music theory can now replace the piano with the qwerty keyboard and substitute a compact disc of fifty-eight three-second tracks with a simple click-and-play hypermedia interface. Aesthetic possibilities in composition and sound design have compounded exponentially in this digital age: armed with an audio interface and microphone, the contemporary sound enthusiast is technician, producer and artist. The unique and expansive reach of new media tools, however, demands attention from our preoccupation with sound, and may prove to do more to expand the vocabulary of the contemporary composer in pairing with other modes, such as visual and interactive design.

Much has been written regarding computer assistance in music. By design, the repertoire is flooded with art works and essays that engage with technology harnessed for synthesis, or computer-assisted aesthetic; archiving, or computer-assisted documentation; and automation, or computer-assisted control. If discussed as a duality these could be expressed as "Human vs. Machine" agency. Computer-assistance in compositional practice is well defined in current discourse and readily identifies with many components within the scope of new media. This

dissertation focuses on contemporary modes of expression through which musical sensibilities can achieve new aesthetic (product) and engagement (user) possibilities. It is relevant to discuss media in terms of character on a continuum between "traditional" and "new." By definition, these types of media are certainly not mutually exclusive: rather, new media and its manifestations in the digital social network is such that it could be considered, equally, as a vessel for traditional media as well as a genre in which old media forms are merely a component node.

This recent discourse has focused on how art, digital or otherwise, has been affected by the collective-of-intelligences, otherwise known as the "internet." All cloud-based computer systems share various streams of user-data that may be used to generate, archive and automate. However, social networks created between personal computing devices can be used to do more than develop and then document an artwork. Contemporary social media technologies facilitate links between an artist (user), artwork (product) and audience (user) in which the interactive, the modular and the remixable elements of a product(ion) may develop a unique fluidity between any number of dualities. Social media and its effect on the compositional process could be described as dualities of "user and network" or "artist and audience" that are now possible in real-time. This dissertation examines and documents the process of developing a musical composition that is particularly attuned to the currency which new media affords. This media spectrum, as the source of the aforementioned dualities, includes new media concepts such as remixability, modularity, interactivity, hypermedia, video environments, projected reality, and other such design principles and compositional techniques.

This dissertation may lead to further discourse into data enabling artworks and compositions. Such ideas are linked to the ideologies of the "Internet of Things"¹ movement in which developers and designers link network technology with otherwise non-computational devices. For example, the composer as digital artist may facilitate new communication nodes that connect the artist and the audience in creative and exciting ways. These channels are already used in a manner that focuses, more and more, on the networked elements of this new media. Our preoccupation with a sound(ing) product and sound(ing) experience is particularly acute in this age of the consumer-revolution. The twenty-first century composer is a consumer and creator in this new media-scape. Society's thirst for consumable content is voracious; in the future, if it is not evident in the present day, digital content producers may be highly valued as a community of skilled individuals, of which many contemporary composers have the earliest of memberships.

Composers have always embraced the cutting edge in approaching the development of style and the technologies that drive society's pervasive push into the future. Musicologists tell us that many, or perhaps most, of the greatest composers were also conductors, soloists, and entrepreneurs; a multidisciplinary approach leads to success in the music business by historical precedent. Critic Robert K. Logan supports this notion: "The multidisciplinary approach is the only way to get at the large patterns of the interplay between a society and its technologies,"² and in this his frame of reference is not music, but new media. The following literature and taxonomy review sets the stage for an examination of current compositional practice with a focus on the chief tool of the new media age: the personal computer.

¹ (Evans, 2011) p. 1

² (Logan, 2010) p. 370

Many of the articles, books and websites referenced in this dissertation may be dismissed as dated and passé; in a field of exponential development, a decade-old article is considered antiquated. In response to this, I reference a comment made in a subchapter of Logan's book, "Understanding New Media," in which he attests: "...a medium does not disappear when it becomes obsolesced; instead it becomes an artform."³ The purpose of this essay, and the demonstrable composition that supports it, is to survey contemporary modes of expression in art—that is, digital, networked and musical aesthetics.

Ultimately, this dissertation will position contemporary new media practices for today's composer as a natural and logical technical evolution of our craft. This notion is threefold: the computer, as the common "instrument" of all contemporary artists, is the transmitter or vehicle; the network, digital and social, is the inexorable link between users, both artist and audience; the inherent modularity and remixability of content, is as inherent in new media as it is in the centuries-old practice of musical composition. The aforementioned continuum of media, old and new, is set in a spectrum concerning a variety of new media dualities; input/output, construction/deconstruction, operator/system or user/network.

Introduction to New Media

As Ippolito, Blais, et al, would have it, "New Media [forms] hold out the promise of toppling...behavioral hierarchies, rather than merely changing the subjects taught according to them."⁴ Furthermore, this notion is paralleled acutely in networked media: "internet-based social media [has become] an increasingly important aspect of marketing communications... in the music industry."⁵ The practice of musical composition, its resultant modes and aesthetics, have been

³ (Logan, 2010) p. 370

⁴ (Jon Ippolito, 2009) p. 71

⁵ (Margiotta, 2012) p. 5

irrevocably altered in the digital age with the new lingua franca known cryptically as the "web 2.0."⁶ Dybwad mirrors some of the ideas of Logan and Manovich, postulating: "the most interesting aspects of Web 2.0 are new tools that explore the continuum between the personal and the social, and tools that are endowed with a certain flexibility and modularity which enables collaborative remixability — a transformative process which... create(s) new forms, concepts, ideas, mashups and services."⁷ In this dissertation, the terms "web 2.0," "new media," "social media," and "networked media" will be used interchangeably. As a reflection of the complexity of meaning embodied within "new media," it will be used as a catch-all term. The reach of the term "new media" in the context of this dissertation will include concepts, methodologies, design principles, and technologies. "New media" will reference hardware and software alike and will have manifestations in genre and style, being inexorably linked with early 21st-century notions of social networking, computer networking, internet, digital media and web 2.0. Weaving our way through some relevant "new media" discourse, we will explore some of the key terminologies that pertain to the use of "new media" tools as may concern the contemporary computer musician, music producer and composer.

⁶ "Web 2.0 or Social Media is affecting the way people communicate, make decisions, socialize, learn, entertain themselves, interact with each other or even do their shopping. They also suggest that the Web 2.0, next to transforming peoples' individual and group behavior, has also affected the power structures in the marketplace, causing a substantial migration of market power from producers or vendors towards customers. Web 2.0 applications are by and large based on content generated by users often being anonymous and lacking qualitative credentials. This is a basic difference from previous internet applications: the user as an essential contributor is a new marketing parameter instigating a migration of market power from producers to consumers and from traditional mass media to new personalized ones. **Web 2.0 or Social Media is a collection of open-source, interactive and user-controlled online applications expanding the experiences, knowledge and market power of the users as participants in business and social processes.** Web 2.0 applications support the creation of informal users networks facilitating the flow of ideas and knowledge by allowing the efficient generation, dissemination, sharing and editing / refining of informational content". (Fountain, 2008) pg 232-233

⁷ (Dybwad, 2014)

Chapter 2

New Media Concepts

Remixability

Well known to human culture is the practice of borrowing and reworking discrete cultural objects. Lev Manovich guides our general understanding of this concept with parallels to the artisans of antiquity and to more familiar movements in art such as electronic music practice of the 20th century; he calls this "cultures of remixability."⁸ These discrete cultural objects can take the form of downloadable music samples, which the user may or may not be able to manipulate, or they can take the form of a blogger posting hyperlinks or publishing bookmarks.⁹ Like much of the subject matter of this dissertation, the common tool in this contemporary remix culture is the personal computer.¹⁰ Manovich later contends that it is only in music and computer programming that practitioners openly remix using sample libraries. With the computer instrument and musical interface functioning as part of our main concern as contemporary composers of new media, remix culture will be explored thoroughly in the dissertation and in the original chamber opera, *BoMoH*.

According to Manovich, a true understanding of how media is affected by the practice of remixability is akin to a metaphor relating the user to a train-station with media as a train: "Information arrives, gets remixed with other information, and then the new package travels to other destinations where the process is repeated."¹¹ Social media is a software manifestation of new media technologies used to facilitate remixability; services like Facebook are customizable avatars or profiles that are comprised of personal and shared digital content featuring media. In chapter IV, this dissertation will focus on the components of the macro-structure of the *BoMoH* cycle as a series

⁸ (Manovich, 2005) p. 2

⁹ Ibid.

¹⁰ Ibid p.3

¹¹ Ibid p.2

of five (5) component compositions with a supplementary media library. The five works that comprise this new media chamber opera and the supporting modular media can be remixed by an artistic director, much in the same way a social media user can populate their "bulletin boards" with media from various "content communities."¹² In chapter III, this dissertation will offer insights into the subject of this chamber opera, the Bomoh, who as an "institution" is a "cultural accretion"¹³ of a variety of religious traditions. The syncretic nature of the ritual practices paid homage to in the *BoMoH* cycle is emulated in the adaptation of the social media structural model; a form of "electronic communication...to share information, ideas and content"¹⁴ that is "designed to be customized by its users."¹⁵ The *BoMoH* chamber opera combines the structural facilitations of social media (remixable structures) with the multicultural collage of religious rites and practices surrounding the Malaysian peninsula (the media modes).

Modularity

While modularity is not a necessary condition for remixability, it can be beneficial to the development of a personalized or customizable media experience, and it is this notion that is chief among the various promises of new media design. The modular elements of a media product, as Manovich describes, "know how to couple with other [objects] - and can even modify itself to enable such coupling."¹⁶ Modularity as a concept is not without precedent in the new music world: from the twentieth century we have a notion of "cultural modularity [that] involved artists... making finished works [from a] small vocabulary of...modules."¹⁷

¹² (Fountain, 2008) p. 231

¹³ (Ahmad, 2014) p. 81

¹⁴ (Simeon Edosomwan, 2011) p. 1

¹⁵ (Manovich, Lev Manovich - Software Studies, 2008) p. 229

¹⁶ (Manovich 2005) p. 4

¹⁷ Ibid.

Manovich uses another clever example of preexisting modular systems that function in the world of general acceptance: children's building blocks, such as Legos,¹⁸ a modular system that facilitates user remixability. In the new media-scape, discrete cultural objects (lego-blocks) are available in libraries that can be used to construct original cultural works (lego-constructions). With this metaphor in mind, we can examine new media modularity as a form of "granular(ization) of content."¹⁹ As a familiar concept from our Computer Music Taxonomy, structures of micro-content, or grains, are the basis of a common technique and feature of the computer musician's lexicon, discussed later. Notions of granular synthesis when juxtaposed with granularization of modular new media, offer the richness in exchange between the forces of sonic and visual design in computer art. These interdisciplinary crossovers are prime examples of the aforementioned natural evolution of the computer musician towards the harnessing of new media tools. Modularity of sound, as a method that involves the dissection of media materials, is vastly different from traditional notions of "deconstruction" in music, and is not a synonym for "critical discussion."²⁰ This concept is rather the facilitation of structures of fragmented or segmented media, which assists the development of customized media forms of the type exemplified in social media platforms.

Manovich offers a model of "ultimate modularity/remixability"²¹ that aligns with many of the aims of this essay, dissertation and compositional project. This model includes familiar archetypes such as the DVD content menu,²² the iPod shuffle playlist²³ and the modular products of a superstore

¹⁸ (Manovich 2005) p. 4

¹⁹ Ibid. p. 7

²⁰ (Krim, 1998) p. 298

²¹ (Manovich, Remixability and Modularity, 2005) p. 6

²² Ibid. p. 7

²³ Ibid.

like IKEA.²⁴ In designing a user-friendly and customizable methodology for facilitating modularity and remixability, it is the former two examples—the digital interface examples—that offer much to an approach to new media composition. Anshu Saxena discusses a new media design methodology known as Hypermedia, a concept evident in much of the digital music media circulating the many social networks of the Web, and a technique that is explored in the demonstration composition the *BoMoH* cycle.

Hypermedia

Hypermedia, when considered as a design philosophy and as an aesthetic, is hard to define simply, and encompasses a series of new media paradigms. Hypermedia as a method is embodied in readily available software such as Microsoft PowerPoint, an example of a multimodal media design platform that facilitates connections between hypertext and hypermedia. According to Saxena, Hypermedia could be thought of as the "science of relationship management—structuring and navigating"²⁵ information, data and media systems. The data and media collections that are integrated in a hypermedia system are reliant on the connective possibilities of hypertext, a non-linear and non-sequential method for manipulating information units that represent real-world objects and media.²⁶ In this early 21st-century compendium of hypermedia concepts, Saxena lists a series of characteristics that are commonly found in digital design structures that identify with this methodology. Some of the necessary conditions for this hypermedia model are simple: a primary operator or user, a stagnant "main menu" and/or graphical user interface, multiple browsing options, more user content than is possible to access in a single experience/performance, static user content and uninterrupted text

²⁴ (Manovich, *Remixability and Modularity*, 2005) p. 8

²⁵ (Saxena, 2004) p. 26

²⁶ *Ibid.* p. 4

with other media.²⁷ Saxena also describes the content of any hypermedia system as consisting of vast collections of discrete data and diverse interface possibilities, ranging from interactive/feedback to user control. These systems usually include stepped, preprogrammed responses to input, as well as overviews, help, instructions and demonstrations.

From the perspective of the contemporary computer musician, most of these hypermedia archetypes are familiar, including the opposing binaries. More simply put, assuming as Saxena does that multimedia is the integration of multiple media forms,²⁸ a Hypermedia design principle is a combination of hypertext and multimedia. A system that combines various forms of media, such as digital audio and graphics with text, is said to have a multimodal form. When multimodal media is combined and structured with various hyperlinked access points, contact between various media nodes is possible and is placed under the control of the user. Music is inherently multimodal: a single chamber work comprised of two different instruments or performing media with separate timbral sources could be viewed as a multimedia product. Based on an understanding of modality in the style of Lev Manovich; with its acoustic, audio recorded, notated and videographic manifestation, traditional music media is indeed multimodal. Unlike a true hypermedia system, without hypertext or a method for which non-linear links can be established and recalled between discrete music data nodes, even digital renderings of traditional western chamber music could never be classified as a hypermedia form. In one of the component compositions of the *BoMoH* cycle, a hypermedia design principle is applied that utilizes an interesting musical solution to replacing the hypertext component of a hypermedia document. Self-contained component work *Woodsource*, applies a succession of pitch tracking triggers to a library of discrete audio media modes. This map of frequency triggers constitutes the user

²⁷ (Saxena, 2004) p. 14

²⁸ Ibid. p. 24

interface of the performance system of *Woodsource*, substituting click-and-play hyperlinks with a design that uses frequency analysis as the trigger for selections of media.

Other relevant hypermedia terminology, which builds upon Poissant's new media taxonomies, include Saxena's Hypermedia classifications. These include: Self-Paced Linear (PowerPoint Software etc.),²⁹ Linear Branching (Helpdesk Touchscreen etc.),³⁰ Non-Linear Branching (Wikipedia etc.),³¹ Immersion Virtual Reality (Ambisonics etc.),³² and Telepresence (Telematic/Network Music).³³ Most of the component compositions of the *BoMoH* cycle utilize, in one manner or another, Saxena's model for hypermedia design. The versatility of this principle will be explored in chapters III and IV when discussing the concept and structures of each component composition. In the resultant compositions of the new media chamber opera *BoMoH* component works *Trance-TV* and *Woodsource* are key demonstrations featuring hypermedia design elements.

On-Demand Publishing

One of the greatest promises of new media is the capacity for on-demand publishing, known well to the music industry as streaming media.³⁴ On-demand digital media, be it audio, visual, text-based or otherwise, promises a distribution network that circulates content "faster, more cheaply, and more broadly than ever before."³⁵ According to Chuck Tyron in his book "On-Demand Culture," video and music streaming services, which include platforms as diverse as Netflix, YouTube and BitTorrent, accounted for an astounding fifty-percent (50%) of

²⁹ (Saxena, 2004) p. 9

³⁰ Ibid.

³¹ Ibid. p. 10

³² Ibid. p. 11

³³ Ibid. p. 13

³⁴ (Margiotta, 2012) p. 7

³⁵ (Tyron, 2013) p. 3

downstream traffic by March 2011, in the United States alone.³⁶ Digital delivery of an artistic product opens up new and uninhibited communicative channels between the user and the product, in this Tryon echoes Manovich's loose definition of interactivity: streaming media "have opened up new...interactions between producers and consumers."³⁷ From the perspective of creative content producers, new media artists and composers among them, the reality of Tyron's "on-demand culture is characterized not by universal access but by the process of limiting and restricting when and where content is available."³⁸ For all artists who document and archive their portfolio using social and new media channels, a delicate balance must be achieved between free access and content monetization, assuming that financial profiteering in digital media is a concern of the composer. Rather, a benefit of on-demand publishing, when linked with the social network, is the ability to curate and customize for the benefit of a niche audience or online communities.³⁹ The component composition *Trance-TV*, along with the adaptation of Hypermedia design, offers a hypertext or hyperlink score exists as an compilation or remix of a sequence of pre-existing streams of video documents which have captured contemporary dance routines and choreographies in moving images. Thus, *Trance-TV* is an experiment in using the aforementioned on-demand facilitations of new media, to communicate interdisciplinary and cross-cultural contexts in the development of artistic modes of expression.

As a "straightforward marketing tool, [streaming media] incorporates populist activities such as liking, commenting, voting,"⁴⁰ which engages directly with the user/consumer, potentially affecting the artist and their output. Additionally, Tyron's "celestial miniplex"⁴¹

³⁶ (Tyron, 2013) p. 20

³⁷ Ibid. p. 154

³⁸ Ibid. p. 41

³⁹ Ibid. p. 34

⁴⁰ Ibid. p. 126

⁴¹ Ibid. p. 31

concept supports the notion that the chief benefit for an artist to provide artistic content on-demand utilizing the cloud, is for the purpose of discovering an audience hungry for niche or alternative content.⁴² Even as digital delivery made it possible to access movies on demand, movie fans faced the challenge of navigating the different platforms where content was available. However, consumers were also offered a more personalized and fragmentary, or modular, media experience. "Platform mobility," or the networking of content, seems to offer the ability to customize content, much in the way that media platforms such as social media, are indeterminate remixed media structures that conform to the individual's singular interests.⁴³ The mobility facility of on-demand publishing is what allows a hypertext score, like the one proposed in figure 1, to function as a method for communicating artistic and musical ideas without the need for notation or semantic language.

Figure 1. An excerpt from the hypertext score used in *Trance-TV*, from the *BoMoH*.

<u>TRANCE-TV</u>	<u>HYPERMEDIA PERFORMANCE SCORE</u>
CUE (#)	HYPERLINK
(1)	https://www.youtube.com/watch?v=9ms7MGs2Nh8
(2)	https://www.youtube.com/watch?v=JItkRLVlf-c
(3)	https://www.youtube.com/watch?v=_nbg3DmWv2Y
(4)	https://www.youtube.com/watch?v=R5EJiXQRz6g
(5)	https://www.youtube.com/watch?v=QOISCBRmfWY
(6)	https://www.youtube.com/watch?v=n21Fdovyme4
(7)	https://www.youtube.com/watch?v=fk6jqj5m1Ko

Social Media

In defining the conceptual and technical components of this dissertation, web 2.0 tools and software platforms identifying as social media are also to be used interchangeably for they are

⁴² (Tyron, 2013) p. 130

⁴³ Ibid. p. 117

two-sides of the same coin. Fountain and Constantinides describe social media tools in five different categories: blogs, social networks, content communities, bulletin boards, and content aggregators.⁴⁴ User-generated content is an essential feature of social media. Social media tools, such as blogs, social networks, communities, and forums, attract a vast number of users who not only participate and interact but also create and share content.

Three characteristics define user-generated material: the content is made publicly available over the internet, it includes a certain amount of creative work, and it is created outside of professional routines and practices.⁴⁵ Facebook fan pages are mainly used as an information source, and content includes photo and video material, information on merchandise products, and upcoming concerts and news updates, among other items. Yet compared with more traditional media, participants have developed highly specialized consumer communities, otherwise known as social networks, in which they interact with producers to extract more differentiated and exclusive content.⁴⁶ The facility for direct interaction between the user and the producer has created these niche markets, as previously described by Tyron.⁴⁷ In the next chapter we will differentiate between the manifest forms of interactivity exemplified in both software and hardware, though both are identified in this dissertation as components of new media and a major component of the contemporary composers skill set. In this dissertation, the definition of interactivity we will adapt as a design philosophy is further in line with the theoretical principles of academics such as Lev Manovich and Aaron Smuts.

Social media, as a software paradigm, is a collection of open-source, discursive and user controlled online applications expanding the experiences, knowledge and market power of the

⁴⁴ (Fountain, 2008) p. 231

⁴⁵ (Jari Saloa, 2013) p. 25

⁴⁶ Ibid. p. 38

⁴⁷ (Tyron, 2013) p. 31

user as a participant in business and social practices. Web 2.0 applications support the creation of informal user networks facilitating the flow of ideas and knowledge by allowing the efficient generation, dissemination, sharing and editing/refining of informational content.⁴⁸ While social media platforms are nestled within the scope of new media tools, not all digital tools, nor all forms of digital interaction, can be described as exploiting networked technology.

Short for "web logs", blogs are a type of online journal, and is the most familiar type of web 2.0 application. Blogs are generally concerned with text media; micro-blogging service Twitter is an example of a blogging network. The network, as a necessary requirement for media of the social variety, is perhaps the most pervasive; as a category it is inclusive of many of the most popular channels, including Facebook. Social networking applications allow users to build personal websites accessible to other users for the exchange of personal content and communication. Content communities are archival platforms that share and store particular types of content. Popular examples include video sharing software such as YouTube. Forums are websites for exchanging ideas and information usually around special interests; computer musicians would identify with trouble-shooting bulletin boards for software companies familiar to composers, such as Cycling '74 or AVID.

Consumers use social media to conduct their informational searches, develop opinions, and make purchasing decisions. Therefore, a strong social media presence is crucial to successful management of a career in music, regardless of stylistic and academic connection. Management of the artist's avatar must include promotion via social media by providing information using a variety of media formats, stimulating social media-based conversation, and developing artist-fan

⁴⁸ (Fountain, 2008) p. 232-233

relationships by engaging users and consumers.⁴⁹ The focus of this dissertation and its resultant project in composition design, exists outside a new media-scape that includes social media tools for content production. Saloa, Lankinen & Mäntymäki contend that a key feature of contemporary social media tools is that they facilitate creation by users outside of "professional routines and practices."⁵⁰ Therefore, with our preoccupation on approaches to new media tools for professional composers and computer musicians, social media principles will not feature in the design experiments of the compositional case study of chapter IV. However, social media is an excellent example of a culture that exemplifies Manovich's remixability and modularity model, thus, as a design principle in-and-of itself, social media platforms are an excellent representation of new media concepts in practice.

Computer Music Taxonomy

A detailed compilation of computer-based art in concept and genre as a lexicon has been provided by editing director of the New Media Dictionary Louise Poissant.⁵¹ Interestingly, a chapter of this dictionary of electronic and digital arts is dedicated to subjects assumed from what is common practice for the contemporary computer musician. As traditional practitioners of sounding media, composers should be well aware of the preexisting links between digital art's various forms of media, mode and genre. Contemporary composers and new media artists alike use digital technologies to create audio content for media, analyze sonic content and collect data pertaining to sound. In first defining the familiar aspects of digital sound, this dissertation proposes an open acknowledgement of the other forms and aesthetics of digital/network based

⁴⁹ (Margiotta, 2012) p. 11

⁵⁰ (Jari Saloa, 2013) p. 25

⁵¹ (Poissant, 2001-03)

art, and their profound effect on the artistic process and output of the modern composer and content creator.

Audio recordings of acoustical phenomenon, or perhaps, any digital rendering of a sonic event, is a central new media mode. As composers first, with visual media artistry an auxiliary skill, the core proficiency of the computer musician is the command of audio media. "The freezing of sound as recordings is central to [the] electroacoustic music that dominates the computer music community."⁵² A collection of the modular audio media, encased within the supplemental media library, is based in such technology; recordings of live phenomenon including the human-voice and musical instruments are used as fixed-media components of the various performance systems and computer interfaces of the *BoMoH* cycle.

The component composition *Bullroarer*, make uses of the digital audio technique known as additive synthesis. Smith and Serra define this technique as a method that models a complex waveform "as a sum of sine waves," with input parameters that vary the "amplitude and frequency of each sine wave."⁵³ The input control parameters of the additive synthesis engine in *Bullroarer* is affected by the data extrapolated from a human interface device. Textures of sine tones and saw waves, with a variety of modulating filters and timbral affects, create a complex and dynamic electronic music effect.

The component composition, *Tolak Balah*, makes uses of the digital audio technique known as subtractive synthesis. This method refers to computational functions that "imitate the sound generation principles of analog synthesizers of the 1960s and 1970s. The Basic principle...is to first generate a signal with rich spectral content and then to filter that signal with

⁵² (Dudas, 2010) p. 29

⁵³ (Smith III & Serra, 1987) p. 3

a time varying resonant filter."⁵⁴ The performance system that supports the performance action in the *Tolak Balah* is based on a digital subtractive synthesis model. A series of twenty-four (24) active audio streams are constantly modulated using a series of interpolating presets. These filters affect the amplitude, frequency bandwidth, panning and resonance of each of the signal streams.

The component composition, *Han(t)uman Face-Dance*, makes uses of the digital audio technique known as granular synthesis. Barry Truax describes this as a method that "produces complex sounds by the generation of high densities of small 'grains' on the order of magnitude of 10-50 (microseconds) in duration."⁵⁵ This granulization of sound is similar in principle to Manovich's modularity concept, in which discrete media objects are arranged by the user to form new complex media structures. Therefore modularity and granular synthesis are unified new media concepts.

⁵⁴ (Antti Huovilainen, 2005) p. 1

⁵⁵ (Truax, 1988) p. 82

Chapter 3

New Media Methods

Introduction

As this dissertation proposes a working method for new media in the contemporary composer's tool belt, it is perhaps the principles of "interactivity" that offers the greatest parallel to the aforementioned spectrum of "old" and "new"⁵⁶ media in art. Two of the most outspoken critics of interactive art describe "interactive" media as a wide spectrum encompassing classical chamber music as well as computer-human interfacing.⁵⁷ Aaron Smuts lists a number of conditions for interactivity in art and design: the perception of agency,⁵⁸ an absence of control and predictability,⁵⁹ and certainly, interactivity is "responsive."⁶⁰ The kind of response one would expect from an interactive module is somewhere between completely controllable and totally random.⁶¹ Lev Manovich does not find the term "interactive" helpful in new media discourse, as computer and user communication is inherently interactive.⁶² In fact, many new media commentators whose speciality focuses on the social network would list social media sites that boast a forum for user feedback as a form of interactive media.⁶³ For the purposes of this examination of new media, interactivity for composers should require only two of Smuts' conditions: a responsiveness to user input, but not an absolute subservience to the user's control. Social Media in this understanding does not fully qualify as interactive for our discourse; rather, we will focus our attention on common/commercially-available human interface devices, such as the Wii-remote, Kinect, webcams and other such sensors that have a precedence in use with

⁵⁶ (Smuts, 2009) p. 53

⁵⁷ (Manovich, *The Language of New Media*, 2001) p. 34

⁵⁸ (Smuts, 2009) p. 62

⁵⁹ *Ibid.* p. 63

⁶⁰ *Ibid.* p. 64

⁶¹ *Ibid.*

⁶² (Manovich, *The Language of New Media*, 2001) p. 55

⁶³ (Fountain, 2008) p. 232

custom-made performance systems in new media art and computer music composition. In this second chapter we will look at two categories of hardware with consequence to the practices of the computer musician: the gestural device (Wii-remote etc.) and the sensor (Kinect etc). Seminal music technologist and co-creator of the "mp3" algorithm, Karlheinz Brandenburg, said of this artistic milieu: "Interactivity will blur the lines between listening, creating music and computer games."⁶⁴ And so it is that a truly interactive design philosophy will embody, in the tools used and structure of the art work, the aforementioned spectrum of old and new media. Traditional roles in performance and design are challenged in interactive media: which is the instrument and who is the artist, when humans interact with computers?

Interactivity

Art that features the computer is fundamentally interactive. Other artistic uses of the computer are of interest, but they do not constitute a new artform based on the computer in the manner that interactivity does.⁶⁵ The definition of this new media design principle varies from artist to academic, in this dissertation I will advocate a general sentiment offered by Myron Kruger, that interaction, if not interactivity, is the essential condition for what defines computer art.⁶⁶ This interaction ideology is in line with our established rhetoric regarding the quintessence of the personal computer. This omnipresent and central tool of the new media artist is the catalyst for some of the exciting ways composers can use content production techniques to enhance/expand the aesthetic and engagement potential of their craft. The first chapter of this dissertation, with the exception of the hypermedia sub-chapter, has focused on technological systems that were developed for production and marketing; next, in delving into a discussion of

⁶⁴ (Yago de Quay, 2011) p. 11

⁶⁵ (Krueger, 1985) p. 54

⁶⁶ Ibid. p. 146

interactivity, we will focus on the computer as a performance system. Atau Tanaka describes not only interactive computer systems, but any performance instrument as “a self-contained and autonomous sound-producing object that enables a musician to perform in a live situation.”⁶⁷ The quintessential craft of the computer music composer is the art of developing performance scores along with algorithms, which informs the (inter)actions of the system and its operator—the instrument and its performer—in a given artwork. The aforementioned spectrum of old and new media, this open dialogue between performance system (product) and performance artist (user), is an ever-present dichotomy that is well documented by music academics as interactive composition. Richard Dudas offers a concise outline for this dialogue: “a computer music performance system generally contains an input device to acquire data, mapping algorithms to translate data into musical information, a sound synthesis engine to be played by the live input, a compositional structure to define the musical progression of the work and an output system to diffuse/perform the resulting sounds in the performance space.”⁶⁸ In the next sub-sections of this chapter we will describe two categories of input device that extend beyond traditional performance systems and instruments: biofeedback (sensors) and motion capture (gestural) devices.

Biofeedback and Biosensing

Electronic and computer music pioneers have experimented with data-enabling the human body from some of the earliest stages of computer and technological development for artistic purposes. Knapp and Lusted attest that “...the use of electrical signals emanating from nerve and muscle (bioelectric signals) to create music came into being in the late 1960s.

⁶⁷ (Tanaka, 2009) p. 233

⁶⁸ (Dudas, 2010) p. 30

Numerous bioelectric musical recordings and performances were produced in the 1960s and 1970s, most of which fall under the general heading of biofeedback experiments."⁶⁹ Current developments in technology are facilitating, more than ever before, practical applications for utilizing a data-enabled human body as a performance instrument. From a purely theoretical approach to these technologies, Manovich describes the potential of the human-computer instrument as a "...qualitatively new phenomena" that will be achieved through "real-time control of media."⁷⁰ Yoichi Nagashima, in an early-career paper, defines a series of bio-sensing and bio-feedback tech-categories that have a common precedence in interactive composition and new media art as follows: "Breathing Media,"⁷¹ a method for extrapolating data from the respiratory function of the performer; "Muscle (Electromyogram) Signals,"⁷² converting electrical impulses of muscle expansions/contractions to digital information; and "Bio-feedback,"⁷³ a method by which a human performer and computer may exchange low-frequency wave data. Other categories or examples of interaction between the human instrument, bio-data and new media, include Wagenaar's "Kadoum," in which "heart-rate" sensor data collected from performers in Australia were sent wirelessly from mobile devices to electric-motors, which were used to excite water-buckets in an installation in the United States;⁷⁴ Andrea Polli's "Gape," which uses an eye-tracking device, based on video tracking technology, to control sound;⁷⁵ the "InterHarmonium" performance system, based on the research of Brouse and Miranda, which uses "Electroencephalogram (EEG)" to bring together geographically disparate chamber musicians to

⁶⁹ (Lusted, 1990) p. 42

⁷⁰ (Manovich, *New Media from Borges to HTML*, 2003) p. 20

⁷¹ (Nagashima, *Interactive multimedia performance with bio-sensing and bio-feedback*, 2002) p. 2

⁷² Ibid.

⁷³ Ibid. p. 4

⁷⁴ (Ge Wang, 2008) p. 2

⁷⁵ (Polli, 1999) pg 407

perform compositions using brainwaves alone.⁷⁶ These are all examples of converting unadulterated bodily-function, muscle pulse, eye movement, and brain-signals into computational data that can be used to control interfaces and instruments for the making of music and art.

In composition, the tracking tools combining bio-sensing and eye-movements is explored in the component work *Han(t)uman Face-Dance*. Video tracking software built into max/MSP is the core of this interactive performance system, which collects data related to finite "voluntary control"⁷⁷ movements of the eye(s). As described in Polli's "Active Sound" article, two of the three categories of eye-movement are exploited by the interface of *Han(t)uman Face-Dance*, including "smooth pursuit"⁷⁸ and "saccades,"⁷⁹ from which two-dimensional (x/y axis) position tracking data is collected and used for sonic and visual display. Additionally, the more dramatic eye-gesture between the variants of an open or closed eyelid, is used in the performance instructions for this work, offering an additional spectrum of voluntary eye-gestures that can be used to great effect when visualized using an augmented reality system.

Gestural Device

In approaching a clear understanding of interactivity within the context of approaches to new media, it is relevant for today's digital practitioners to consider some of the popular trends in the technological facilitation of artistic and musical expression between the data-enabled

⁷⁶ (Brouse, 2005) p. 334

⁷⁷ (Polli, 1999) p. 405

⁷⁸ "Smooth eye movements keep the line of sight on a selected object and compensate for motion on the retina that might be caused by motion either of the object or of the head and body. In order to be initiated or sustained, smooth pursuit requires an external moving visual signal". (Polli, 1999) p. 405

⁷⁹ "These movements are rapid jumps of the eye used to shift gaze to a chosen object". Ibid.

extensions of the human body and these interactive artworks that feature custom built performance systems. With gestural and motion capture technology, we may examine a milieu of interactivity that utilizes a more deliberate performance action for the purpose of real-time manipulation of media. De Quay and Skogstad's "Dance Jockey" is an example of harnessing motion-capture technology, "the process of acquiring data in a computer about human limbs and large-scale body movements,"⁸⁰ as a methodology of control for media in real-time. Using photographic and videographic technology to provide informational data for computational purposes has a precedent beyond the current decade, as the aforementioned Andrea Polli example suggests. However, new media academic Yoichi Nagashima of Shizuoka University describes what he calls the "fatal problems" of visual-based biosensing: limited computational time.⁸¹ More than a decade after Nagashima's warning, and with powerful software systems commercially available to the public, interfacing sensors that are native to common computer hardware are a readily accessible tool that can be utilized to great effect by the contemporary composer as new media artist.

This dissertation will describe this category of data-enabling technology, which is key for interfacing with deliberate performance action, as the gestural device. This sub-chapter and the compositional product of this study will focus on two common technologies: the motion-capture device and the accelerometer, both used in the *BoMoH* cycle. Motion tracking applications may include the basic sonification experiments of Catherine Laws, which are an example of tracking performance gestures in a manner that provides direct feedback to the human instrument. By attaching sensors to the extremities of a pianist and percussionist, and position-tracking those

⁸⁰ (Yago de Quay, 2011) p. 11

⁸¹ (Nagashima, *Bio-Sensing Systems and Bio-Feedback Systems for Interactive Media Arts*, 2003) p. 50

sensors with infrared cameras, chamber musicians were provided with a real-time sonic remapping of their gestures during performance. Laws attests that this process not only enforces a strict performance economy, in which data-enabled performance feedback makes the performer aware of their space, but that this extension of chamber music practice with new media technologies also positions their craft as an interdisciplinary approach: "composition as choreography."⁸² As an argument for utilizing new media approaches in compositional design, Law's multimodal approach could be described as an economy of movement and, as an efficient use of all data-enabled parameters connected to inherent performance gestures. The lesson of Law's experiments with gestural-mapping technology is the manipulation of performance inherency: using the data that is naturally derived from interfacing with a traditional instrument and applying this information to new media tools, which include the computer, to extrapolate useable digital information that can be applied to the performance system in a variety of ways.

Motion-capture and visual-tracking technology has a pre-existing foundation in the world of dance: e.g., *New York Dance* and their wireless sensor suits, *Palindrome Dance* and their custom EyeCon software, Suzuki's bend-sensor body suits for real-time motion-based granular synthesis of sound and image, as well as the aforementioned work of de Quay and Skogstad's use of the Xsens MVN motion-capture suit in "Dance Jockey."⁸³ With the use of sensors to track the human instrument, this embodiment methodology is the quintessential application of data-enabling the rich cache of gestural information available to all composers and performance artists.

⁸² (Laws, 2014) p. 139

⁸³ (Yago de Quay, 2011) p. 11

The new media composer, when presented with a project that involves both a human instrument and a computational device, would be remiss not to utilize the many technologies that can capitalize on inherent embodiment and action in performance artistry. For the purposes of musical composition, without regard for interdisciplinary approach, camera-based gestural sensors are recommended for achieving an untethered interactive performance experience.⁸⁴ A category of gestural control that senses motion without the need for image technology is available in the use of the commercially available microelectromechanical accelerometer.⁸⁵ Chris Kiefer et al. describes this wireless technology of the accelerometer, perhaps best exemplified in the commercially available Nintendo Wii-remote, as "arguably the most interesting...controller (type) for musicians."⁸⁶ The Kiefer team further describe the data-enabled device as multifaceted, with a range of interpretation possibilities; however, "acceleration data ... is inherently noisy; if it is rolled or tilted then gravity affects the readings and it is difficult to... get the true acceleration value."⁸⁷ Thus the electromechanical device, as with all technology, is not infallible. It is however, as is the case with the Nintendo Wii-remote, a cheap and readily available technology that data-enables the gestural components of performance art. The component composition *Bullroarer* makes use of the data-enabled functionalities of the Wii-remote as a device for gestural sonification. This is the sole example of a gestural device performance system developed in association with this dissertation.

⁸⁴ (Dan Overholt, 2009) p. 69

⁸⁵ (Rob O'Reilly, 2009) p. 1

⁸⁶ (Chris Kiefer, 2007) p. 1

⁸⁷ Ibid.

Video Environments

All music professionals, from pop-entrepreneurs to champions of the avant-garde, are aware of the power of visual reinforcement of a sonic medium. In this age of streaming music media and modular consumable content, a natural partner for audio media, computer generated images, either moving or still, can interact with an audio environment with an incredible potential for variety. In the context of social media and networking platforms, streaming media on popular services such as YouTube, require both an audio and visual component. Furthermore, as a new media artist, the contemporary composer will find what Myron Kruger calls the "sine qua non"⁸⁸ of computer art: that interaction with visual displays of data are a natural development in modern compositional expression. The following discussion will survey a small collection of new media tools that extend beyond more traditional notions of video art, and acts to utilize the personal computer's "most unique feature: (the) ability to respond in real-time."⁸⁹

Previous definitions of interactivity are upheld in this section of our new media literature review; however, in maintaining this understanding of the human-machine relationship, our focus will emphasize an understanding of the term "responsiveness" as a design principle for new media and computer art. Kruger suggests that "physical participation (is) the key distinction of virtual reality"⁹⁰ and rather than explore the plethora of fixed-media solutions that composers can employ to add visual interest to their media, it is real-time computer-generated, and user-affected, images that we will discuss. In chapter IV, we outline that the *BoMoH* cycle is comprised of a series of input/output computational platforms that places a variety of new media objects as node networks between the continuum of operator and system. Again, the

⁸⁸ (Krueger, 1985) p. 146

⁸⁹ Ibid.

⁹⁰ (Kroker, 2002)

aforementioned spectrum of old and new, as a metaphor for modality, interactivity and narrative, is addressed in the development of interactive systems that require as a condition the implementation of the computer instrument, coupled with a dynamic user.

In Saxena's new media spectrum, our key design principles of Hypermedia and Interactivity exist on opposing ends of the spectrum. Structured as a spectrum encompassing "Hypermediated and Virtual-Reality"⁹¹ systems, both are described as gloriously vague function-based principles that relate to a wide range of tools and techniques. Virtual Reality systems usually invite the audience/user to interact with an artwork that involves being able to freely navigate "within" a three-dimensional environment.⁹² These two or three-dimensional simulations seem inexorably linked to certain developments in human interface devices, namely "Head Mounted Displays"⁹³ as well as haptic response interfaces.⁹⁴ As Saxena contends, "everyday computers... can't run (virtual reality)"⁹⁵ and it is for this reason that this study is limited to visual systems that can be designed and operated using desktops, laptops, hand-held and other mobile computational devices. The term and contraction VR (virtual-reality) will not be used in this dissertation, for reasons of its cultural references. Thus, Saxena's descriptions of the typologies that fall within the VR end of the new media spectrum will be concerned mainly with the design philosophies of interactivity.

⁹¹ (Saxena, 2004) p. 8

⁹² (deLahunta, 2002) p. 105

⁹³ (Kroker, 2002)

⁹⁴ (Beilharz, 2007) p. 368

⁹⁵ (Saxena, 2004) p. 8

Hypermedia Video Environments

Saxena describes hypermedia video-documents as mere recreations of an "age-old concept of interactive communication returning us to a mode of story-selling that was illustrated dramatically with pictures."⁹⁶ However, this theorist's criticism plays directly into the conceptual position of the present work: the antiquated traditions of the Bomoh's rites and practices, when juxtaposed with the contemporary rites and practices of computer art, expose a series of cultural equivalencies. These symbolic pairings are apparent in the various interactive structures of the *BoMoH* cycle, the patterns of communication between the various structural modes that undulate around the flow of data between two poles. We have identified these poles as the dualities within the range of previously discussed new media tools, as well as allegories to the religious structures of the narrative.

Component compositions *Tolak Balah* and *Trance-TV* are hypermedia performance documents that are comprised of identical sets of video media that is structured in two distinct ways. In the *Tolak Balah* these visual media objects are arranged into two opposing streams that are mixed based on patterns of frequency band-width by the input of the user/performer. The frequency patterns are ordered by a modular musical performance document. The various resultant frequency patterns of the performance input varies the relative opacity of each video image. The pair of video streams is a direct reflection of the various dualities mentioned above, and exemplifies the notion of a node vacillating between two media poles.

In *Trance-TV* the visual media modules are arranged into a random collection that is sequenced to the permutations of a Malaysian rhythmic tradition. While the performer/user is not coerced into navigating through the hypermedia interface of *Trance-TV* by a linear reading

⁹⁶ (Saxena, 2004) p. 184

through the modular performance document, as in *Tolak Balah*, the human operator will experience a more unsystematic structure of video objects. The user/performer has an almost infinite control of the temporal structure of each change in the video presets; however, unlike the fixed sequence of visual media in each of the *Tolak Balah* video streams, the media sequence in *Trance-TV* is indeterminate and unpredictable. The variety of structures that these hypermedia designs afford, facilitates innumerable conceptual possibilities. The narrative structure of the component compositions and the affect of these conceptual images on the new media methods applied to each work, is discussed further in chapters III and IV.

Projected Reality

The lesser-known augmented or projected reality performance system exists on the interactive end of Saxena's multimedia-to-virtual-reality spectrum. Simulations in which virtual data are combined with real-world contexts are considered forms of virtual reality.⁹⁷ The pioneering work by artist-programmer Myron Krueger in the early 1970's was the first to establish the aesthetic potential of projected reality video installations. His early experiments with what we now call virtual reality developed into a series of responsive environments from which the audience could use full body gesture to interact with an array of spatially projected digital media.⁹⁸ Krueger presents a model for augmented reality that focuses on the relationship between action and response rather than the aesthetic of the visual display. In this basic reactive relationship between computer and performer, Krueger advocates for a uniformity between the gestural actions and the visual display, though he permits that most musicians disagree that a

⁹⁷ (Klopfer, 2007) p. 372

⁹⁸ (Beilharz, 2007) p. 368

direct correlation between action and response is a positive design outcome.⁹⁹ Louise Poissant defines this form of virtual reality or interactive visual environment as "a real-time video image(s) of the user interacting with the system ...(with integration) into a projected computer display."¹⁰⁰ Kruger postulates that "the potential created by the juxtaposition of live and computer images is significant."¹⁰¹

In composition, this notion of a projected other is explored in the component work *Han(t)uman Face-Dance*. Video tracking software built into max/MSP is the core of this reactive performance system that converts the user's eye "movements... into actions in the graphic scene."¹⁰² Unlike the "novel" experience described in Kruger's original developments in video tracking and artistic expression, *Han(t)uman Face-Dance* is rather a performance and computer art polylogue for a user that is as committed to exploring the interface, as they are to present a unique and dramatic interpretation of the "word cloud(s)"¹⁰³ and "word score" (discussed in chapter IV).

⁹⁹ (Krueger, 1985) p. 146

¹⁰⁰ (Poissant, 2001-03) p. 153

¹⁰¹ (Krueger, 1985) p. 147

¹⁰² Ibid.

¹⁰³ A word cloud, also known as a tag cloud, is a graphic representation that illustrates the important words that appear in a body of text. The words are proportional in size to their frequency of use or importance in the text. This article explores three aspects of a word cloud. First, I trace the origin of word clouds and their usage in blogs and other social media sites as they evolved into a valuable organizational and communication tool. (Nickell, 2012) p. 564

Chapter 4

Building Block in Pre-Composition

Introduction

The *raison d'être* of this new media chamber opera, titled *BoMoH*, is "the creation of (a) hybrid virtual/physical theatrical event... that ...question[s] the boundaries between art, theatre and technology."¹⁰⁴ Utilizing new media design philosophies, familiar concepts from computer music, and aesthetics from various chamber music traditions, this tech-opera is a cycle of modular and remixable compositions that may be experienced in either an installation or theatre space. The five consolidated, self-contained compositions can be arranged into a unique dramatic structure for each performance or installation. The narrative that has inspired each component composition is inspired by a series of interviews in which the subjects describe the events and settings surrounding the instance of a three-year-old boy's ritualistic exorcism.

Concept and Narrative

The composition, and subject of this dissertation, the *BoMoH* cycle utilizes computer mediation, live performance and new media in its structural design. Each of the component works focalize one or more of the religious, ritualistic and cultural images described in the dissertation podcast (see appendix A), as well as to scrutinize one or more of the new media design concepts previously discussed. The conceptual framework of this entire chamber opera presents audiences with an experience of the vibrant multicultural and religiously syncretic setting of post-war Singapore in the 1960's. The events described in the dissertation podcast occurred around the year(s) 1963-64 and are focused on the possession and subsequent ritual exorcism of the secondary protagonist, the young son of the podcast interviewees.¹⁰⁵ One of the

¹⁰⁴ (Lichty, 2000) p. 351

¹⁰⁵ (Oliveiro M. , Bomoh Interview #2 (Tano Oliveiro) Doctoral Dissertation Podcast 030315, 2015)

story's narrators describes the anthropological heritage of Singapore as a "predominately Malay culture"¹⁰⁶ and thus, many of the adaptations of the various traditions paid homage in this opera, are extracted from the peoples of Colonial Malacca.¹⁰⁷ From the illusive indigenous roots of Singapore, the true protagonist of the narrative and namesake of this dissertation is presented as: the "Bomoh." This ancient Malaysian shaman is a spiritual healer and medicine-man that functions to "divine the causes of sickness with the help of his own auxiliary spirits."¹⁰⁸ However, the Bomoh are themselves "possessed and act as mediums as well as sending their own souls/spirits [forth to enact their will]."¹⁰⁹ In most component compositions of this new media chamber opera, the character of the Bomoh is embodied in the performative rites of the user/performer. When staged, the protagonist of this narrative is not a traditional dramatic or operatic performer, but rather, the performance artist that interacts with the computer system, human interface or musical instrument. This is particularly true in *Bullroarer*, *Tolak Balah* and *Trance-TV*, in which the audio, visual and interactive design of each composition is intended to make reference to the ritualistic performance elements of Singapore's indigenous spiritual traditions. In harnessing the metaphorical power of spirituality and spiritual-possession, a corollary to the spectrum of old and new media presents itself: the performance of a religious rite is a self-regulating system "that is set up by a stimulus and response through continuous feedback. [New Media] performance is [also]... a self-regulating ... cognitive exchange between the performers actions"¹¹⁰ and a responsive system of the likes of an audience (traditional) or computer (new). The secondary protagonist, the infantile subject of the exorcism, is also a key narrative component and source of embodiment for the performative elements of the *BoMoH*

¹⁰⁶ (Oliveiro M. , 2015)

¹⁰⁷ (Ahmad, 2014) p. 79

¹⁰⁸ (Lewis, 1993) p. 361

¹⁰⁹ Ibid.

¹¹⁰ (Lichty, 2000) p. 352

cycle. The narrators tell of a true story of exorcism in which some very vivid images and symbols are brought to bear. These visceral allusions include a haunted tree, a demonic monkey, the sound of hollow logs and wood-frame drums, a swamp that doubles as a Malay burial ground, and a shamanistic grass hut. These provide a collection of familiar images that can be woven together to form a complete narrative of an indigenous Singaporean religious rite. Focusing on the concept of possession, component compositions *Han(t)uman Face-Dance* and *Wood Source* facilitate the embodiment of the subject of the exorcism, including the advent of the spiritual possession and its effect on the secondary protagonist. Again, the performative elements of the new media design, and traditional notions of performance art, are utilized in order to reflect the spectrum of spiritual conceptualization to spiritual embodiment that is implied in this narrative. Coinciding with Lichty's theory of Cybernetic performance, the metaphorical function of the compositional design and application of new media in this dissertation culminates in a model of a performance response system that is a "feedback loop [functioning] on a number of levels: the performer-artist relationship, the artist-machine interplay, and the self-regulation of the machines/performer themselves."¹¹¹

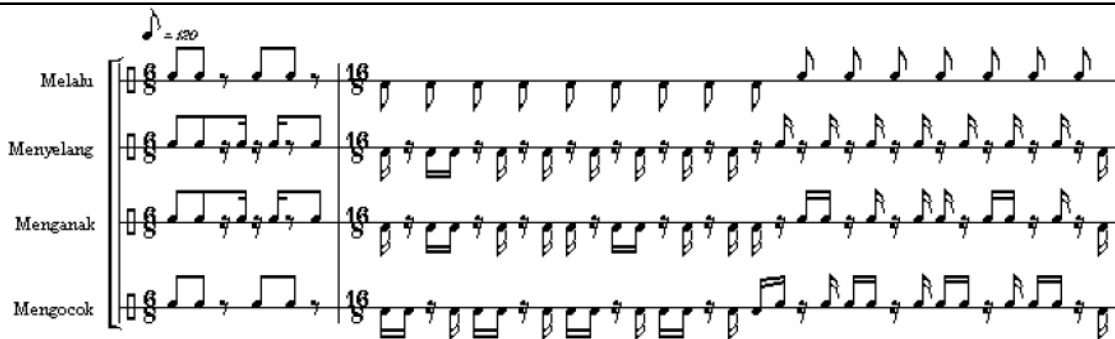
Borrowed Cultural Elements

In piecing together the images and symbols that evoke the cultural setting of a shamanistic rite from indigenous Singapore, a number of distinct musical and visual references are required and have been implemented in the design of this new media chamber opera. Foremost among these borrowed cultural archetypes is the Malay tradition of "kompang" drumming. Dr. Mohd Hassan Abdullah of the Universiti Pendidikan Sultan Idris writes: "In the Malay world, the instrument is called the kompang by the Malay people who are settled in the

¹¹¹ (Lichty, 2000) p. 352

Malay Peninsula, [including] Singapore."¹¹² "Traditionally, the kompang is not a solo instrument. It is always played in the form of an ensemble (see figure 2). The music of the kompang ensemble is composed of three or more different parts in [an]... interlocking rhythmic pattern."¹¹³ These durational/temporal structures are implemented in a variety of ways in the

Figure 2. An excerpt of a traditional Malay Kompang drumming in western rhythmic notation.



various component compositions of the *BoMoH* cycle. In figure 3 an excerpt from component composition "Bullroarer" is shown. Here various subdivisions of the metric systems, transcribed in Abdullah's essay *Introduction to the Authentic Kompang Playing*, are used to structure the number of iterations of a particular gesture using the Wii-remote. In his text it is evident that structures of repeated rhythms are superimposed at differing temporal ratios inherent to the nomenclature of this tradition. Each *pukulan*, or form of interlocking rhythmic patterns, is made of several *pukulan*, or small rhythmic form(s).¹¹⁴ Each component composition of the chamber opera *BoMoH* utilizes the *pukulan* inspired temporal structures at various ratios at both the micro and macro structural level. The hypermedia composition *Trance-TV* also makes use of these

¹¹² (Abdullah, 2010) p. 2

¹¹³ Ibid. p. 9

¹¹⁴ Ibid. p. 10

which is delivered as an audio feed to the performer/user through headphones. The performer is then free to externalize these numbers in a freely spontaneous manner, based on the discretion of the performer/user.

Much in the same way that a culture of music reflects the living pulse of a people, the semantic language of a cultural group is reflective of the same: e.g., the Creole, "Bazaar or Low Malay"¹¹⁵ language of what became native to the pre-colonial Malaccan Sultanate, covers a geographic region spanning from modern day Sumatra, to as far South as Arnhem land in mainland Australia.¹¹⁶ Reaching further back into history, Ahmad attests to the multilingual origins of the Malay language, including the addition of Arabic, Persian and Turkish, to more traditional borrowed lexicon, including Sanskrit and Tamil.¹¹⁷ Truly, Malay as a historically complex and multicultural language is an appropriate poetic choice as a representation for the ethnic diversity of Singapore. Figure 5 is a translation of a series of Malay Creole verse, authored

Figure 5. An excerpt from the Creole-poem used in the Bullroarer, from the BoMoH.

Hantu	
by Felicity and Tano Oliveira	
Pertas, pertus.	(The sight, the sound)
Adoi, amboi.	(The pain, the pleasure)
Sumpah, sumpah	(I swear)
Kayu api gua	(On the firewood)
Sumpah, lu mati	(I swear, you die)
Bismillah doa selamat	(In Gods name I pray for good luck)
Boleh-lah kita berjumpa	(Can we meet you)
Minta-lah berjalan hormat	(we ask for honourable path)
Orang sakit hendak ubat	(The sick man needs medicine)
Hantu gelap, Jangang sombong	(Dark Spirit, don't be proud)
Kita faham kerja awak	(We understand your work)
Hantu, hantu boleh tolong	(Spirit, spirit can help please)
Balas dia mesti angkat.	(the burden must be carried by him)

¹¹⁵ (Malay, 1975) p. 745

¹¹⁶ Ibid. p. 746

¹¹⁷ (Ahmad, 2014) p. 78

by the narrators of the dissertation podcast as an attempt to recreate the type of dialectal Malay that may have been used for ritualistic purposes by religious figures such as the Bomoh. Thus, it is culturally appropriate to adapt some of this vernacular into the various media tropes that comprise the component works of the *BoMoH* cycle and its supplemental media. As a further corollary to the multicultural and syncretic allusions drawn towards the subject matter of the opera, this language is, within itself, multicultural and musically adept, even though the language is non-tonal. Words such as "bismillah" (from Arabic), "adoi" (from Low Malay), "blur" (from English) and "buay" (from Hokkien) are all examples of words borrowed from other languages within the Singaporean Malay Creole dialect, representative of syncretic language used for cultural affect in the *BoMoH* cycle (see figure 5). In adapting both the semantic and non-semantic, in audio and visual representations in media, homage is paid to the people and the culture.

As a further exploration of some of the symbolic manifestations of the aforementioned predominant Malay culture, much of the visual design of this new media chamber opera employs still and moving images which are related to the cultural and chronological contexts of post-war Singapore. This includes, though is not limited to, representations of environmental scenes with a focus on natural vegetation and bush-habitat, stop-motion images of geometric designs based on indigenous tattoo art from the Malayan peninsula, segments of traditional Japanese cinema as extracted from public domain sources, abstract animations of light and fire, and depictions of religious iconography. As discussed below, structures of remixed and randomized cultural images serve to reference the multi-cultural milieu and syncretic structure of the social and religious life of Singapore at this time. Additionally, these images are built into many of the

fixed structures of the component works of the *BoMoH* cycle as well as existing in a reduced and modular form, in the supplementary media library.

Modularity and Remixability Revisited

The macro-structure, that is, the narrative/operatic form that ties these five component works of the composition *BoMoH* together, facilitates an indeterminate experiential outcome whether staged as an installation for the user or a theatrical performance artwork for a small collection of chamber players. Lev Manovich argues for the great benefits of modularity, mostly related to the facilitation of remixable new media materials.¹¹⁸ In explaining this, Manovich again turns to examples related to music and musicians, in which a modular musical product, the 24-track master tape, could be segmented into "various elements" and then "remixed" into a new form.¹¹⁹ Composers that utilize the structural potential of new media tools and design principles may choose to implement a modular aspect to their work, if indeed indeterminacy and remixability is the right aesthetic choice for the concept, message and program of the artwork. This dissertation is, in essence, an exercise in and an examination of the processes and methodologies of remixability. With our focus on the "design software and music composition software [that] make the technical operation of remixing very easy" and with "the Internet greatly increas[ing] the ease of locating and reusing material from other periods"¹²⁰ this dissertation and composition are themselves a product of a remixed and modular design philosophy.

¹¹⁸ (Manovich, *Remixability and Modularity*, 2005) p. 2

¹¹⁹ *Ibid.*

¹²⁰ (Eduardo Navas, 2014) p. 145

Additional Discrete Modular Objects

If we approach either a theatrical performance or installation experience of the *BoMoH* cycle as a consolidated hypermedia document, then we must consider this new media chamber opera as more than a series of five performative/performable works, but as an extensive library of a variety of media types than can be arranged to the extent that the creative limits of the user/performer/artist allow. As part of the software package/folder that accompanies the score and instructions of the new media chamber opera *BoMoH*, a long list of supplementary audio and visual media objects are made available in order to enhance the theatrical presentation of the work. Unlike other remix cultures and practices, the *BoMoH* cycle is presented in its modular, deconstructed form. Therefore, re-composition as facilitated by the inherent remixability of this new media library is a requirement of any installation or performance of this cycle. This new media chamber opera is intended to function as an absolutely remixable multimedia product, thus embracing Manovich's lego metaphor,¹²¹ in which a collection of discrete media segments, as basic "building-blocks," can be utilized and rejected by the user/artist at the whim of their artistic integrity. The deconstructed composition consists of building blocks of self-contained media to be appropriated into new structures and forms.

Design as a Metaphor for Narrative

The artistic choice to apply the design philosophies of new media with more traditional performance art is a reflection of the narrative concept of spiritual possession in the *BoMoH* cycle. Notions of conceptualization and embodiment in religious systems have already been identified as the spectrum of spiritual experience that is not only the subject of this opera, but is also manifest in the design of the new media objects and interface, as well as the composition of

¹²¹ (Manovich 2005) p. 4

various applications of performance and musical arts. These design archetypes and the application of the spirit metaphor are bound to the expressive and interactive capabilities of the central instrument of this new media chamber opera, the personal computer. Similar to Martin Lister's musings on network nodes and media in his book "New Media: A Critical Introduction," the *BoMoH* cycle is designed as a network of cultural objects with "the computer...at the heart of [a] dispersed system of new media."¹²² The computer is the vessel of all incoming and outgoing media, perhaps a reflection of the likeness of the "house of the spirit" or hut described in the dissertation podcast.¹²³ As a media machine, this central performance instrument—this hub of interaction—is a "multiple input/output device capable of receiving large amounts of data as input, as well as making equally large quantities available for [output]"¹²⁴ or display. Each performance that uses this *BoMoH* system is a node of a variety of media combinations within the library or server, with the computer as the transmitter in a vast network of remixable performance adaptations.

As mentioned previously, interactivity in computer art inherently relies on notions of human and computer interaction. From this perspective these structures of input and output are changeable between the human and computer instruments, as a reflection of various conceptualizations of spiritual embodiment between the protagonist, the Bomoh, and the secondary protagonist, the Child. Thus the structural modes of input/output relations in each component work are as follows:

- human input triggers computer output in *Woodsource*, a hypermedia interface with fixed media audio;

¹²² (Lister, 2009) p. 32

¹²³ (Oliveiro M. , Bomoh Interview #4 (Tano Oliveiro) Doctoral Dissertation Podcast 030315, 2015)

¹²⁴ (Lister, 2009) p. 32

- human interface input with computer audio output in *Bullroarer*, a reactive computer system that converts non-musical performance gestures with a human interface device into live audio output;
- computer audio output to affect human performance output, to human performance input to computer video output in *Han(t)uman Face-Dance*, a word-score audio, performance art and projected reality interface;
- computer score generation which informs a human performance input, to computer video output in *Tolak Balah*, a responsive video mixing system;
- a human input and computer output of audio and visual material in *Trance-TV*, a hypermedia interface that modulates audio and visual materials based on a simple human input trigger.

These new media chamber works, in their exploration of ritual in the cultural practices of the Bomoh, traverse the spectra of human and computer, traditional and new, input and output, audio and visual, all as corollaries to a continuum between the spiritual conceptual and spiritual embodiment, the arts of the Bomoh as "Shaman." Traditional notions of how the art of a shaman would be manifest in a ritualistic performance, or trance, are perpetuated in this chamber opera named for just such a practitioner, the Bomoh. "Shamanism...from the analytic point of view can be defined as simply 'ecstasy' or as an archaic form of mysticism and less simply as a specialized trance during which [the Bomoh's] soul is believed to leave his body and ascend to the sky or descend to the underworld. The instruments and goals accompanying the ecstatic condition may vary...but the meaning is always the same—the connection of the shaman to a world not readily accessible to ordinary human beings through an abnormal state, the trance."¹²⁵ Musical

¹²⁵ (Jones, 1968) p. 332

manifestations of trance have known precedents, including the use of "drum[s] and cymbals"¹²⁶ accompanied by acts where the ritual performer is also a "dancer"¹²⁷ and "sings."¹²⁸ The practical nature of the various input/output structures of the spiritual and mystic in trance is deeply connected to the shamanistic roots of the Bomoh and the culture of the indigenous Southeast Asians. Additionally, the conceptual nature of the various input/output structures of the human performer and the computer is strongly connected with contemporary notions of new media design. The metaphor of input/output in spiritual possession is paralleled by a structure of interaction between traditional performance for a human operator and new media design for a computational instrument. If the computer is truly a part of the zeitgeist in art, then as a performance device it is most apt for representation as the instrument of the Bomoh, a metaphor for possession in a narrative focused on exorcism.

How to Structure a Performance of the BoMoH

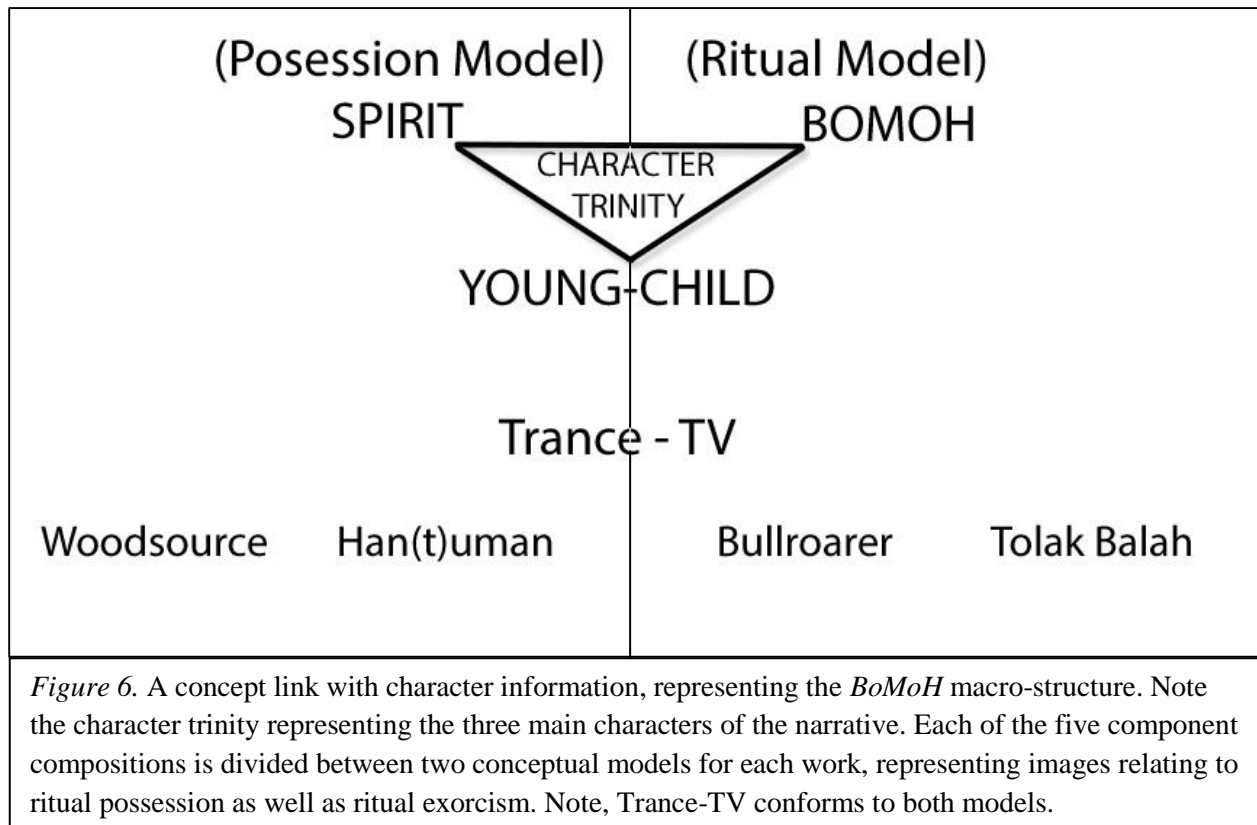
The *BoMoH* cycle is conceptualized as a sequence of dramatic images that represents a simple narrative of spiritual malevolence, possession or spiritual-embodiment, ritual performance and exorcism. These images fall within three distinct abstract categories, related to the potent cultural images and characters of the narrative: the Spirit, Bomoh and Child. Aforementioned metaphors relating to cultural symbols such as the monkey, the tree, wood and grass are manifestations of the three characters and, in and of themselves, a corollary to the Catholic trinity, another source of referential symbology. The table in figure 6 outlines the

¹²⁶ (Jones, 1968) p. 336

¹²⁷ Ibid. p. 337

¹²⁸ Ibid. p. 342

various conceptual and narrative links that structure each component composition as well as some of the media folders within the supplementary media library. These links delineate how



each unique performance element, media object or interface is linked to the various narrative components of this chamber opera. As figure 6 suggests, the characters throughout the narrative are split into a succession of dualities (duets), in which the Bomoh and Spirit are continuously and inexorably linked to the character of the Child. In the spirit of this indeterminate macro-structure, and in exemplifying the ideologies of a new media remix-culture, the user/artist is able to freely apply each media object in a unique sequence so long as one component work, with or without a collection of supplemental media objects, is used to represent each of the three central characters. Therefore, the simplest and most basic performance of the new media chamber opera would include at least two component works in any given sequence; three images in

performance, visualization and sound, representing what we may now call the protagonists of the "Bomoh Trinity." Additionally, Saxena describes the differences between multimodality and multimedia in his new media text detailing design theories from multimedia to Virtual Reality. The *BoMoH* cycle is very clearly a multimedia collage of images related to the concept of ritual exorcism within a syncretic Malay-based culture, however, it is also multi-modal. "Different input modes"¹²⁹ separate the two performance settings of the *BoMoH* cycle, one an "installation" version places the audience or user as the operator of interaction with the computer instrument in a gallery space, and the other, a "theatrical" version places a single performer as the operator of the computer instrument in the concert space. While a single audience member/user could easily navigate each of the component compositions of an installation setting of the *BoMoH* cycle, more than one chamber performer may be required of a theatrical setting of this work, depending on the versatility of the performer in question.

¹²⁹ (Saxena, 2004) p. 42

Chapter 5

Case Study in Composition

Introduction

Five explorations of new media and computer-enhanced musical composition contribute to the structure of the *BoMoH* cycle. As a model for a hypermedia design principle, the *BoMoH* chamber opera functions as an indeterminate sequence of ritualistically inspired performance art pieces in which the human operator and their interaction with the computer instrument becomes a reflection of the symbolic dualities that are integral to the concept and narrative of the work. Structures of hypermedia and interactivity are built into the design of several performance systems, utilizing the computer, in order to symbolize the various patterns of spiritual embodiment implied within a narrative that fetishizes shamanistic exorcism. It is from the syncretic cultures of Singapore that this story assumes its cultural collage, as it is most keenly manifest in a life of multi-faceted religious observance. "To the ancient Malays, all things have a [spirit]"¹³⁰ and it is from this pantheistic belief system that the assumed drama of possession, respective notions of mastery of the supernatural as well as a subservience to invisible malevolent forces, that the central conflict of the narrative is drawn. While the previous chapter was indeed a thorough explanation of the holistic form or macro-structure of the *BoMoH* cycle, this fourth chapter focuses on each pillar of the structure. The ensuing detailed explanations of each component composition and their associated media libraries outline a top level macro-structure of this new media chamber opera.

Wood Source (Hypermedia/Possession Model)

The component composition *Wood Source*, as with all of the self-contained structures within the *BoMoH* cycle, can be presented either in a concert format or as an installation. *Wood*

¹³⁰ (Ahmad, 2014) p. 82

Source is designed as a hypermedia document, a two-dimensional map that facilitates a click-and-play, as well as a pitch-based interface, for a human operator to cycle through a plane of fixed-media audio. This hypermedia document draws upon a unique library of wooden sound objects that are triggered indeterminately by negotiating, or performing, the map either as a user in the "installation" setting (clicking along the invisible triggers on a map depicting a picture of a "tree's bark") or as a performer in the "theatrical" setting (where sequences of fixed-media objects are triggered by sequences of pitches or frequency bandwidths). The hypermedia interface of *Wood Source* is pictured in figure 7, including the trigger regions on the tree-bark

Figure 7. The trigger map and still image from the *Wood Source* performance system. Each red dot highlights a trigger point in the "installation" setting of this component work. There are sixty-six (66) trigger points in all.



map. Behind the nature image interface, the trigger system is programmed in max/MSP and includes pitch-following and multi-track sample players as a part of the core infrastructure of the patch. In keeping with Saxena's hypermedia design philosophy, this document is comprised of a

library of audio media that is too vast for consumption in a single experience or performance. Thus, the remixability of *Wood Source* is facilitated by the invisible trigger path that is hidden in the interface/map, to be revealed by the operator with a mouse or with the input pitch of an instrumental performer. The library of audio media and the span of unique trigger points numbers sixty-six (66) discrete modular units. These audio files can be overlaid to a maximum of sixteen (16) simultaneous samples. Instructions accompany the map interface, to be followed by the user and performer alike, detailing in brief messages a series of effective ways to interact with the document. These instructions include clues regarding where to click on the two-dimensional plane, suggestions and feedback related to trigger density, and when to start or stop triggering the map. Thus, in keeping with the established notion of interactivity, the hypermedia document in *Wood Source* is enhanced by offering computer feedback for human input, as well as a computer output triggered by human action. Data flowing to and from the input source is close to at least one of the established models of human-machine interaction, as described in Manovich's writings concerning computer-human interfacing.¹³¹

If a working model of interactivity can stand as a metaphor for "play" in the juvenile sense, then the "game" of performing the hypermedia document in *Wood Source* is linked to a central image in this narrative. The conceptual motif of the spiritually corrupted Child that is possessed by the malevolent force of the "Tree" is a key theme in the exorcism story of the *BoMoH* chamber opera. The narrators of the dissertation podcast say that the Child protagonist was playing near a tree before he became mysteriously ill, and in playing with the tree he was given the vision of the monkey, another key motif in the narrative.¹³² Exploring the hypermedia

¹³¹ (Manovich, *The Language of New Media*, 2001) p. 34

¹³² (Oliveiro M. , *Bomoh Interview #2* (Tano Oliveiro) Doctoral Dissertation Podcast 030315, 2015)

document of *Wood Source* is a reflection of the act of the Child playing at/with the tree in the bush or jungle, the setting of the drama in this opera. This component composition is a simple expression of the experiential nature of this collection of conceptual images, and how those experiences can be brought to life utilizing a hypermedia design approach. Computer-human interaction provides an analog to the image of a child at play near a tree, with the computer itself serving as a metaphor for the tree. This interactive environment can produce unexpected and bewildering artifacts for the user. This simple map of triggers, the still and seemingly lifeless image of the *Wood Source* interface, is a facade for hidden veins and channels teeming with life, a vigor implied in the resultant audio media. Aside from the still image depicted in the performance systems graphical user interface, there is no supplemental video media required to enhance the visual presence of this composition. In its "performance" setting, *Wood Source* relies upon the visual interest of the performance artist as they use the interface of their instrument to trigger the map of hidden fixed-media samples. As the human performs their instrumental rituals, furiously and with intent, a reflection of the image of the Bomoh as a "tree felling"¹³³ practitioner is brought to mind.

Bullroarer (Interactive/Ritual Model)

The component composition *Bullroarer* is structured as a self-contained modular performance score with an accompanying performance system for computer instrument, which sonifies the gestural data provided by the user in the act of using the human interface instrument. A resonant computer music substratum perpetually converts the operator's gestural data into a complex stream of sound utilizing additive synthesis principles. The computer performance

¹³³ (Ahmad, 2014) p. 79

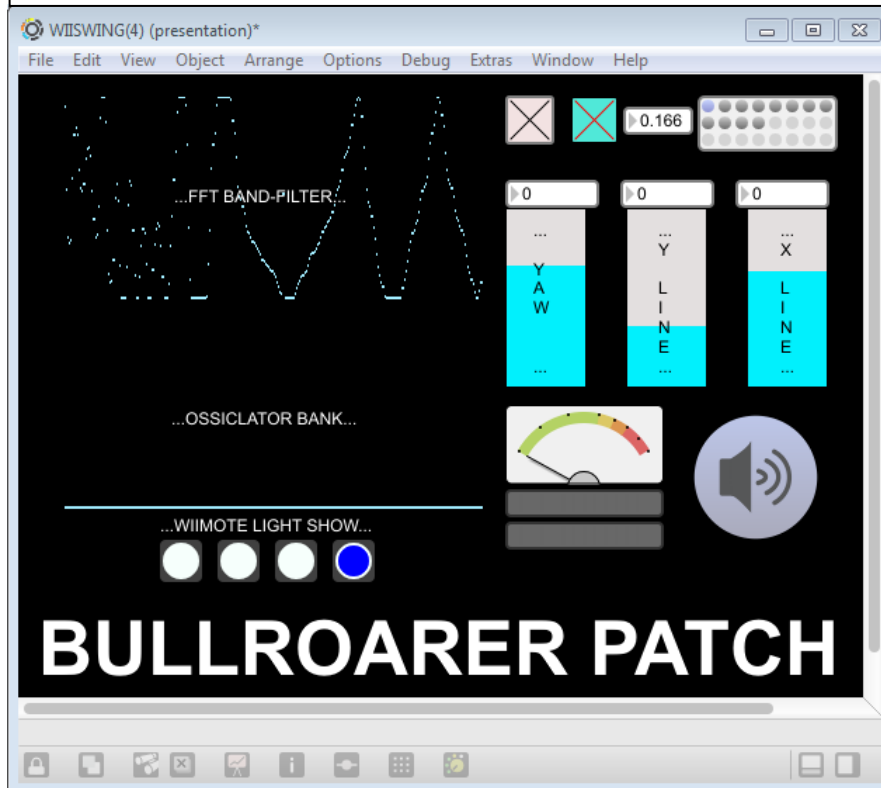
system provides a quick analysis of the type or category of data received from the gestural device, a Wii-remote blue-tooth gaming controller, and automatically selects from a list of presets from which the data sonification will contribute to the musical output. Unlike the hypermedia designs implemented in the two previous works, *Bullroarer* generates all computer sound in real-time without using fixed-media or supplementary audio. The graphical user interface for *Bullroarer*, which displays the systems data-handling of the performer's gestures, provides a platform for tracking the interaction between the computer instrument and the gestural device. While the performer is at liberty to ignore the computer interface and concentrate on the graphic performance score, an algorithmic system built in max/MSP requires input from the human operator in order to continuously generate the soundscape. Aaron Smut's three-part definition of interactivity, as discussed in chapter II, was a key consideration in the design of the *Bullroarer* performance system. In computer art and design, notions regarding restricted output predictability¹³⁴ and a focus on the relationship between performance action and response¹³⁵ is difficult to achieve as these ideas are incongruous. However, despite the incompatibility of some new media theory, interactivity is achieved in this component work, by either aligning the sonic result to the immediacy of performance action, or displacing it temporally in order to disconnect the aural and visual manifestations of performance art in this context. As with much of the conceptual design in this *BoMoH* cycle, the answer to balancing modes that exist on opposing sides of a spectrum is to approach both at once, though in turn.

Figure 8 is a screenshot of the graphical user interface of the *Bullroarer* performance system, which includes a data display, three-dimensional gestural-plane values (x, y, z), and

¹³⁴ (Smuts, 2009) p. 63

¹³⁵ (Krueger, 1985) p. 146

Figure 8. A screen-shot of the max/MSP patch from the *Bullroarer* performance system.



audio output metering. Static instructional information is provided about the interface of the performance system in "installation" mode, providing guidelines that reflect the instructions provided in the performance score of component work *Bullroarer*. The human-machine or input/output relationship in this component composition is uni-directional, a corollary to the symbolic control the Bomoh is said to command over the spirits of the netherworld when transfixed in ritual performance. The control of gesture, the responsibility of the user/performer, in due process becomes transformed into the dynamic movement of an invisible presence, or rather, the soundscape produced by the output of the computer instrument.

The aforementioned omnipresent sound world is representative of the basic Animistic

and Indian mysticism commonly associated with Bomoh practitioners.¹³⁶ Thus, the *Bullroarer* component work is a direct attempt to imagine a staging of the Indigenous Malay "main peteri (cultural performance related to traditional healing)."¹³⁷ The computer music output, functioning as a response to the ritualized gestures of the human operator, is reflective of the art of the Bomoh that seeks to achieve a "unity of man with [that of] spiritual powers."¹³⁸ The graphical notation used in the performance score, a sequence of gestures and instructions including repetitions, is shown as an excerpt in figure 3. The gestural device that is designed to interface with the performance system, the Wii-remote, functions as a digital reproduction of the Bullroarer. This mystic wooden tool is an indigenous ritual object used in religious ceremonies spanning all of Earth's continents¹³⁹ though without a direct connection to the culture of pre-Islamic Malaysia. By imagining the deeply antiquated roots of an Animistic rite, the gestural nature of the Wii-remote lends itself to the common action and "function of the bullroarer...the production of sound."¹⁴⁰ The Wii-remote then acts as the Bullroarer, the namesake of the work, and is a symbol of the ancient origins of religious rituals and how they function as a method for communicating with the "supernatural world."¹⁴¹ Additionally, some optional chant verse is available to the performer, which is encouraged in a "theatrical" setting of the *BoMoH* chamber opera. In Bomoh culture these sacred utterances are known as "mantera" a poetic tradition with an important role within "Malay society."¹⁴² In the dissertation podcasts, the male narrator describes the Bomoh's ritual to include efficacious materials and pathological diagnosis.¹⁴³ In the

¹³⁶ (Ahmad, 2014) p. 79

¹³⁷ Ibid.

¹³⁸ Ibid. p. 81

¹³⁹ (Wescott, 1999) p. 130

¹⁴⁰ Ibid.

¹⁴¹ (Ahmad, 2014) p. 81

¹⁴² Ibid.

¹⁴³ Ibid.

instance of this particular ritual exorcism, the shaman of our story used "dried blue chillies" and "saffron paste"¹⁴⁴ to detect the spiritual possession and illness of the Child. Aside from small references to the "blue" and "red" color symbols in the interface of the Bullroarer patch, provided by the chillies and saffron respectively, the color symbols of the Bomoh's ritual are more strongly referenced in other component compositions.

Han(t)uman Face-Dance (*Projected Reality/Possession Model*)

The component composition *Han(t)uman Face-Dance* is a reversal of the previous work's input/output structure: a computer generated audio score instructs the performance action of the human operator, which in turn triggers an abstract projection of the performer's image as an augmented reality. The remixable and modular elements of this composition are randomly sequenced by the computer, a symbol of the power of spiritual possession; the machine acts as both input and output device, with the human instrument bound to follow cues generated by machine automation. The core infrastructure of the *Han(t)uman Face-Dance* performance system is a projected reality visual output with an accompanying live electronic music texture, triggered by changes in a data stream linked to eye-tracking software. The first input stream is sourced from random modular feeds of an audio word-score, a set of pre-recorded instructions spoken in English that detail a series of performance cues pertaining to the movement of the eyes, mouth and face. An excerpt of the *Han(t)uman Face-Dance* word score is provided in figure 9. Certain segments and stanzas of the word score are appropriated from classical texts in the Hindu tradition, and are utilized in order to provide cultural poignancy and dramatic subtext in support of the narrative. This word score, despite the implied poetic structure, is a stream of verbal commands, including such performance instructions as "respond," "move" and "speak."

¹⁴⁴ (Oliveiro M. , Bomoh Interview #2 (Tano Oliveiro) Doctoral Dissertation Podcast 030315, 2015)

Figure 9. An excerpt from the word-score of the *Han(t)uman Face-Dance*, from the *BoMoH*.

```
###NARRATOR SPEAKS ALL TEXT OUTSIDE ( ), THOUGH INCLUDING [ ]###
```

WELCOME(!)

(CH40) All those who recite [the] Hanuman Chalisa (...)
(...) are sure to be [saved].

(CH10) You are an ardent listener, always so keen to listen to the
narration of [this performance rite]. Your [mind] is filled with
what [you hear in our words]. You therefore always [perform as instructed].

(CH5) With Limbs as sturdy as ([a steel] mace (...))
you are [stoic]and [still]. On you attends [an obedience]
(...). You [cannot resist the] darkness of [these] evil thoughts.

ATTEND(!)

```
###MODULAR SECTION ONE###
```

```
###EYE'S BLINK###
```

```
###NARRATOR SPEAKS ALL TEXT ###
```

Shut your eyes(!)
Open your eyes(!).
Shut them, open.
Shut them, open. Shut. Open.
Shut them, blink. Shut. Open, shut. Blink, flutter!
Shut them.

Additionally, the pre-recorded instructions were developed using text-to-speech software; thus, the synthetic quality of the audio will symbolize the disembodiment of the Hindu poetic structure and the video output related to the human movement data. This second input stream is derived from the facial movements and vocalizations of the performer/user as they respond to the computerized instructions sent to the headphones, unbeknownst to the audience. Both input streams coalesce in a live audio and visual output that takes the form of an augmentation of the performers presence in the theatrical space, the computer monitor or projection. The graphical user interface, as pictured in figure 10, is a series of monitors that display a visual reading of the audio input and output, as well as a series of video monitors that relate to the motion-capture of the users eyes, the visual output of the projected reality system, and a moving image stimulus

system functionalities and presets in the performance system. The various segments of the audio input that comprise the input stream to the performer are additionally differentiated by the variety of performance actions required by the user. Again, Smuts' Interactivity principle related to an absence of "control"¹⁴⁶ is assured when a computer system instructs a human performer towards a gestural action. The spectrum of performance possibilities is endless, especially considering the potential differences of interpretation when a human is responding to machine commands. This instructional data flow from computer to human performer facilitates the exact style of interactive system that Smuts has proposed: a spectrum of communication including completely controllable and totally random outcomes.¹⁴⁷ The modular sections of the word score are output in a random order, continuing to cycle and loop until the performance system is turned off. The new media design principle of *Han(t)uman Face-Dance* positions the operator as the medium in a performance system that is cyclical in its multidirectional data flow, between the computer and user/performer. This embodies Lichty's theory of Cybernetic performance in practice; however, instead of a loop between human and machine interaction, the human entity is entirely surrounded by machine augmentation.

In the aforementioned cybernetic sandwich, the flow of performance data from computer to user to computer is an apt metaphor for the nature of the religious beliefs in Bomoh culture. Animist notions of a "supernatural intervention into human life"¹⁴⁸ is reflected in the flow of instructional data from the computer source, to the human performer. The effect of the spirit world on the human form is developed into a colorful visual hyperbole, by transforming human input data into a simple projected animation. Ahmad lists the variety of supernatural entities that

¹⁴⁶ (Smuts, 2009) p. 63

¹⁴⁷ Ibid. p. 64

¹⁴⁸ (Ahmad, 2014) p. 81

are at the command of the Bomoh: guardian spirits, evil spirits, souls, ghosts, genies and gods.¹⁴⁹ The projected reality visual design of *Han(t)uman Face-Dance*, with its modulating colors, occasion glitches and video delay, and pervasive link to the movements of the performer, is a visual manifestation of the various spirits of the Bomoh. More specifically, the modulating colors, as they vacillate from hues of blue to red, make reference to the blue chilies and red saffron of the Bomoh's exorcism rite.¹⁵⁰ The conceptual narrative for this individual component work is highly connected to the amalgam of religious traditions paid homage in this chamber opera. From among the Bomoh's syncretic practices the influence of Indian rites enhances the richness of the literary aspects of this tradition. The word score for *Han(t)uman Face-Dance* bares a link to the Hindu religion, as does the title of the component work itself. Hanuman is a monkey God in the Hindu religion and the subject of a devotional hymn on which the word score for this work is based.¹⁵¹ Modular section "Zero" of the word score in figure 11 is solely

<p><i>Figure 11. An excerpt from the word-score of the Han(t)uman Face-Dance, from the BoMoH.</i></p> <p>###MODULAR SECTION ZERO###</p> <p>###RITUAL PREPARATION###</p> <p>###NARRATOR SPEAKS ALL TEXT ###</p> <p>(CH40) All those who recite [the] Hanuman Chalisa (...) (...) are sure to be [saved].</p> <p>(CH10) You are an ardent listener, always so keen to listen to the narration of [this performance rite]. Your [mind] is filled with what [you hear in our words]. You therefore always [perform as instructed].</p> <p>(CH5) With Limbs as sturdy as ([a steel] mace (...)) you are [stoic]and [still]. On you attends [an obedience] (...). You [cannot resist the] darkness of [these] evil thoughts.</p>
--

comprised of excerpts from the English translation of the Sri Hanuman hymn. In this word score,

¹⁴⁹ (Ahmad, 2014). p. 82

¹⁵⁰ (Oliveiro M. , Bomoh Interview #2 (Tano Oliveiro) Doctoral Dissertation Podcast 030315, 2015)

¹⁵¹ (Shri Hanuman Chalisa, 2008)

the few bracketed or parenthesized words are altered from the translation. Thus the verse of the word score remains largely reminiscent of the ancient hymn from which it is derived.

Additionally the word "hantu" one of the Bomoh's words for ghost or spirit, is the source of the parenthetical component of the contracted title, *Han(t)uman Face-Dance*.

Tolak Balah (*Responsivity/Ritual Model*)

The component composition *Tolak Balah* is structured as a modular musical notation document that is coupled with a reactive live-remix system of multiple streams of fixed-media audio and visual material. The modular aspect of this component composition comes in the variety of performance input options available to the user. In the theatrical setting of the *Tolak Balah* the performer is required to follow a modular musical score that includes a multitude of

Figure 12. An excerpt from the "performance" setting score of the *Tolak Balah*, from the *BoMoH*. Grand pause gestures featured in the first and last segments of the staff.

The image displays a complex musical score for the piece 'Tolak Balah'. It features multiple staves with various musical notations, including notes, rests, and dynamic markings. On the left side, there are two vertical scales labeled 'Pitch-tracking bandwidths'. The top scale ranges from 5500-6000 Hz to 800-1000 Hz, and the bottom scale ranges from 550-600 Hz to 30-100 Hz. The score includes dynamic markings such as *p*, *ff*, *f*, *sfz*, *mp*, *f > mp*, and *fff*. There are also grand pause gestures indicated by double bar lines at the beginning and end of the first staff. The notation is dense and includes various rhythmic and melodic elements.

keyboard-style chords, flourishes, repeated patterns and motifs, each of which will trigger a

series of preset responses from the audio-visual remix system. In this performance score, modules are separated by "grand pause" bars of rest. These pause notations (see figure 12) are opportunities for the system to respond, as well as for the user to reflect upon their trigger choices and then select the next gesture from the score. From the perspective of an interactive design philosophy, the *Tolak Balah* performance patch facilitates a "responsive" link between live-input and concurrent threads of audio and video media. The various streams of fixed media are, as the name implies, unchanged in order and structure from one performance to the next, however, it is the variety of user input that will affect which streams of media are experienced by the audience at any given time. As in the instance of the component composition *Woodsource*, the various streams of fixed media in the *Tolak Balah* are triggered by a variety of frequencies, or frequency bandwidths, which are affected by the input of performance action. It is a requirement of this component composition, unlike all others, that the user/performer must use a musical keyboard-style instrument/interface in either setting, in order to trigger the media streams. Despite the development of a unique performance score for a "theatrical" performance of the *Tolak Balah*, any musical input or pitch combination can be keyed-in using the live-instrument or interface in order to navigate through the system's media; improvisation is an appropriate option for an "installation" setting of this work. In the design and performance notes for *Tolak Balah* the performer/user is required to pay attention to the resultant media during a performance of the system, in order to remix the fixed-media in a manner that replicates the art of a contemporary video disc jockey. More than functioning as the medium for a series of trigger-response presets in the digital framework, the performance system of *Tolak Balah* is an interface of remixable and customizable data streams, much like the very structure of contemporary social media platforms.

Ahmad's text on Malay culture describes two forms of the "tolak bala," one as a prayer of thanksgiving,¹⁵² and the other a ceremony of "ritual bathing to dispel evil."¹⁵³ Thus, as an evocation to the spirit world, the component composition *Tolak Balah* is a ritual model with a focus on the control and response of supernatural forces at the behest of the actions of the protagonist. Again, the performer/user embodies this central character, the Bomoh, and during the course of a performance the various tracks of the media streams are navigated by the computer operator. Each module of the performance score, or each moment of instrumental improvisation, is a musical mantra that alters the presets and output of the performance system. These mantras or musical modules influence and alter the audio and video response of the performance system, a corollary to the "mantera"¹⁵⁴ practice of the Bomoh institution, which were used to find balance and "well-being,"¹⁵⁵ for protection and solace, and to care-take and "appease the spiritual world."¹⁵⁶ This sacred struggle for harmony is reflected in the performer's responsibility to find a balance in the remix of media, first by correctly performing each musical mantra/mantera, and also in the act of selecting the next module for performance while also reacting to and monitoring the streams of media over the course of a performance of the *Tolak Balah*. The ritual of performance in this component composition is representative of the image of the Bomoh at prayer, attempting to command the entities of his pantheistic¹⁵⁷ world to serve in an "intervention [into] human life."¹⁵⁸ This pantheon of cultures, rites and spiritual forces is mirrored in the variety of media objects that are encased in each of the fixed streams. The two opposing video streams of the *Tolak Balah* performance system are compilations of a variety of

¹⁵² (Ahmad, 2014) p. 251

¹⁵³ Ibid. p. 80

¹⁵⁴ (Ahmad, 2014) p. 79

¹⁵⁵ Ibid p. 81

¹⁵⁶ Ibid. p. 82

¹⁵⁷ Ibid. p. 83

¹⁵⁸ Ibid. p. 81

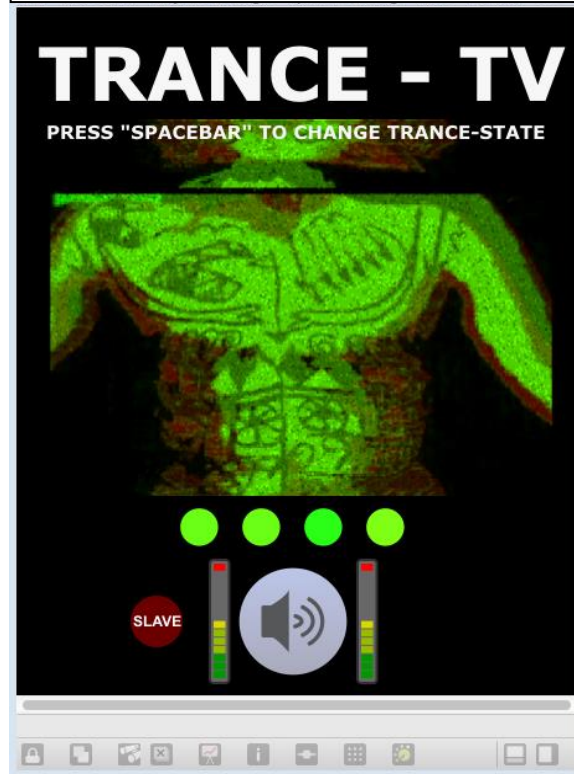
smaller visual media modes selected from the supplemental media library. Additionally, twenty-four (24) continuous audio streams are remixed live via a variety of performance input-data handling techniques. From the Dudas interactive composition model, the *Tolak Balah* performance system acts to acquire data, translate the data into musical information and perform the resulting sounds in an output system.¹⁵⁹ The data input is either amplitude/velocity or pitch information taken from the musical interface, live-instrument or midi-device. The frequency and amplitude data is then mapped to a variety of presets including audio: gain, panning, resonance, delay and filtering techniques. From the output perspective, the performance input gradually affects modulations between the audio streams, including interpolations between a variety of amplitude and filtering presets that produce a texture of continuously remixed audio streams. The *Tolak Balah*, both in concept and design, is a system of control in which the human operator, armed with a musical instrument/interface, consciously and with intent manipulates the structure of balance within the fixed structure of media, creating a metaphor for the human-institutional structures that attempt to control the spiritual realm.

Trance-T (Hypermedia/Possession + Ritual Model)

The component composition *Trance-TV* is structured as an iterative, modular and minimalist exploration of the entire supplementary media library's discrete objects subfolder. This subsection of the supplementary media library is comprised of short audio samples, featuring a collection of live and synthetic percussion samples as well as video files that are recalled by the hypermedia interface of the *Trance-TV* max/MSP patch. Figure 13 is a screenshot of the hypermedia interface in its "installation" setting; displayed on the *Trance-TV* patch-face is a main video output, a series of secondary video output, and instructions to cue the user to

¹⁵⁹ (Dudas, 2010) p. 30

Figure 13. A screen-shot of the max/MSP patch from the *Trance-TV* performance system.



cycle through the sequence of presets. The structure of the subpatchers that order the events and presets of the max/MSP patch of *Trance-TV* performance system, is a time-based step-sequencer. This metronome-based progression of preset number sequences is drawn from the media collection randomly; however, each number sequence will cycle in the preset order unless it is interrupted by human input. These number sequence cycles are used to trigger the various discrete fixed-media samples available in the supplemental media library. These number patterns are most evident in their sonification, in which audio media is linked to each number accented by the step-sequencer. The user or performer input, a simple "on/off" command using a "spacebar" key or "wireless mouse" device, advances each step in the randomized recall of fixed number sequences. Based on Saxena's hypermedia design principles, *Trance-TV* would conform to the

Self-Paced Linear¹⁶⁰ model of hypermedia design, that is, a series of media presets to be presented in a linear, fixed cycle, much like a traditional slide-show presentation. Additionally, each advancing step through these seventy-two (72) programmed presets alters the timbre of the percussive samples. The audience will experience the gradually morphing timbre of the percussive samples as they move from live-recording based media to samples of a noticeably synthesized aesthetic. Video media is also recalled and randomized using the same iterative cycles of preset number sequences.

These number sequences are based, specifically, on rhythmic subsets derived from Dr. Mohd Hassan Abdullah's transcriptions of ensemble *Kompang* performance. Each number pattern used in the step-sequencer is based on semi-quaver or sixteenth note divisions of various metric systems (see figure 2). Some of these number systems are recursive and accent only the odd or even numbers in a sequence, others are much more complex and form antiphonal patterns when synchronized with corresponding rhythmic lines. With its basis in the pulse of the *kompang*, the temporal engine of *Trance-TV* is founded on the rhythmic culture of the Malayan peninsula. As an image pertaining to shamanistic themes and the narrative of this chamber opera, the trance in *Trance-TV* is linked to Rex Jones' descriptions of the audio and visual stimulus associated with the trance rite: drumming, singing, dancing and an altered state-of-consciousness, or possession. Conceptually, *Trance-TV* is an indeterminate remix of East Asian cultural modes, much in the same way that modern dance/pop structures freely deconstruct elements of a culture before coercing them into the familiar structures of Electronic Dance Music. The structural rigidity of *Trance-TV* is the affect of the *Kompang* rhythms which inform the number cycles programmed into the step-sequencer. The metronomic iterations of the

¹⁶⁰ (Saxena, 2004) p. 9

Kompang provide the random streams of video media and transforming percussive timbres with a temporal unity that pulsates in a manner that intends to replicate the aesthetic of an induced trance-state. *Trance-TV* is a segment of the narrative that focuses on the rituals associated with exorcism from the perspective of the practitioner.

Furthering an exploration of the interdisciplinary approach to compositional design, the *Trance-TV* "theatrical" setting calls upon the performer to prepare a movement-based live performance in sequence with each of the seventy-two (72) presets of the hypermedia system. Each movement sequence is to be choreographed by the performer, based on a uniquely designed hyperlink document which utilizes the visual benefits of on-demand and streaming video media, hosted on social media platforms, in order to communicate dance-inspired movement designs and choreography as a fixed score document. Figure 1 is an excerpt from the *Trance-TV* choreography score. In this hypermedia document, a series of hyperlinks/weblinks are listed in a fixed sequences of seventy-two (72) movement motifs that are intended to be synchronized with the identically numbered presets of the *Trance-TV* hypermedia computer system. As mentioned in the performance notes for *Trance-TV*, it is advisable to have a remote mouse device that can be held in the dancer's hand, allowing the performer to cycle through the patch presets while moving about the theatrical space in performance. This live-movement manifestation of the *Trance-TV* component composition is an explicit reference to the physical manifestations of trance in the culture of the Bomoh and shamanistic cultures in general.

Supplementary Media Library

The final component of this new media chamber opera, is the supplemental media library, a non-linear branching¹⁶¹ hypermedia parent folder that arranges a library of deconstructed media segments into a series of "tag" folders related to the various symbols and images of the narrative. The majority of these additional media objects come in the form of audio clips, which can be used to underscore, or perhaps, embellish the themes and motifs that support the images and adapted rituals of this chamber opera. In the instance of long-form supplementary media, these files are intended for use as an underscoring layer for theatrical effect or perhaps to link other media forms, either the component compositions or other supplementary media objects. Most examples of long-form supplementary media come as long audio stems, longer than two (2) minutes. These audio files can be used to form layers of texture that support the performance of a component composition, or perhaps fill in the space between component works or as interludes of a texture. Short-form discrete media objects are intended for use as instances of embellishment or thematic placement, in which references to narrative or components of other works or segments from the chamber opera's macrostructure, are drawn to focus. For example, fixed media segments of the narrator's interview podcast are available for use as short-form media, which in the context of a chamber opera, could be used to function as operatic subtitles; short motivic audio clips of a voice explaining the narrative in simple English, placed atop of the performance of any given component composition, could function as a clear link to the tangible narrative elements of any given moment of the *BoMoH* cycle. Moving and still image media is also offered in the sample library of this new media chamber opera, for use at the discretion of the artist/user. In some instances, these are copies of media already used in a fixed manner in one

¹⁶¹ (Saxena, 2004) p. 10

or more of the component compositions; in others, they are unique supplemental images and symbols that can be used to fill any void in the visual design of the component compositions, strengthening or supporting the various elements of a performance of this cycle. As these supplementary media objects are to be applied to any given performance at the whim of the artist/user, it is acceptable for none, or very few, to be applied to the final structure. Unlike the component compositions of the *BoMoH* cycle, there is no performance system or interface for the supplementary media list. As this library is arranged in folders featuring some of the keywords of this dissertation, certain media modules will be available in multiple subfolders, depending on the conceptual significance of each media object.

Chapter 6

Conclusions

This dissertation has presented a compositional approach that is based upon the unification of contemporary performance interface/system design principles, with the allegory of a narrative that is based in themes of religion, myth and indigenous culture. New media, the design paradigm, is a "cultural phenomenon"¹⁶² while the Bomoh, the abstract paradigm, is a cultural "institution."¹⁶³ If discussed as a duality these analogous cultures could be expressed as "Embodied vs. Conceptual", "Human vs. Machine," and "Old vs. New." These spectra of contemporary modes of expression facilitate a wealthy palate of approaches by which composers can develop unique aesthetics from, and new engagement possibilities between, users and a new media performance system. The media theories we have explored posit a multimedia continuum between "hypermedia" and "virtual reality."¹⁶⁴ In each, the coexistence of media modes and objects are structured in a way that facilitates both connections, as in remix culture, and disconnections, as in modular design. The media modes we have scrutinized exist in their own continuum between the familiar workings of computer sound, and the more pervasive computer image and its interface. Yet as computer musicians, an approach towards new media paradigms also offers a dichotomy between traditional and digital performance interfaces, as well as performance agency between the human and machine. Within these spectra, dualities and dichotomies, the links between what we perceive as tradition, and what we perceive as technological advancement, become a meeting point between the various philosophies and media-types we have discussed in this dissertation. As Dick Higgin's noted in 1965, "much of

¹⁶² (Fuery, 2008) p. 1

¹⁶³ (Ahmad, 2014) p. 81

¹⁶⁴ (Saxena, 2004) p. 41

the best work [of] today seems to fall between media"¹⁶⁵ and this inter-media ideology appears to be the premise of today's age of new media and computer art. The *BoMoH* cycle, in its appropriation of a multimedia/new-media design methodology, and the use of a conceptual foundation based on similar multimodal cultural accretions, provides the audience with two rich and equivalent sources from which the material of this discourse and composition originates.

A command of the technical aspects of the evolution of our craft is an advantageous attribute for composers in this age of the digital social network and new media. Unsurprisingly, the impetus for this change is firmly rooted in the evolution of the personal computer, which has also become a predominant tool for composers. A multitude of preexisting contemporary media art models as well as contemporary media theories, populate the body of this dissertation. In each of these examples a threefold design structure is evident, whether abstract or theoretical, and conforms to a distillation of three basic tenets: user input, media remixability, and communication between networks. The instrumental function, whether "human" or "machine," is the transmitter or input-device while the performance system, either the performer/user or computer, is responsible for remixing the various media modes. Finally, and perhaps most importantly, the network that exists to exchange media, data and other such stimuli in nodes feature either a reuse of input data or culminate in an output of audio and visual material. This is computer and human interaction that embodies new media design in practice. Logan's postulation that the "interplay between a society and its technologies" is only made possible by utilizing "the multidisciplinary approach."¹⁶⁶ Thus, the media links facilitated by concepts such as hypermedia, interactivity, remixability and modularity become a manifestation for the network

¹⁶⁵ (Higgins, 2001) p. 49

¹⁶⁶ (Logan, 2010) p. 370

of spiritual practices that coalesce in the traditions of the Bomoh, which are indigenous to Malaysia and Singapore.

This dissertation has not proposed a new working method for composers; rather it focuses on the evidence of a contemporary interdisciplinary practice that utilizes commonly used personal technologies and engages them to serve the abstract as well as the aesthetic of contemporary composition. The parallel between the structure of design and form in the narrative, as demonstrated in the *BoMoH* cycle, acts as a direct reflection of the multimodal- and multimedia-rich cultures to which this dissertation pays homage. Between the "installation setting" of this new media work, and the "theatrical" setting of the composition as a chamber opera, the multimodality of the "Bomoh Institution" and the "Philosophies of New Media" are compared and contrasted as a reflection of the peoples they represent. Like the rituals of Singapore's syncretic religious traditions, the "installation" mode of the *BoMoH* cycle is available to every user. As with the theoretical principles of interactivity, the performance rites of the protagonist, the Bomoh, require the mediation of an experienced human performance artist in the "theatrical" setting of this chamber opera. This demonstration of what is perhaps more of an intermedia approach to compositional design, exemplifies the crossovers between new media art and practice of music composition, and outlines a subset of the resources that are available to the contemporary content producer with an interest in producing new media enabled art, sonic or otherwise.

Appendices

Appendix A - Links for the Dissertation Podcast

LINK: <https://soundcloud.com/markusmusic-1/bomoh-interview-1-felicity-oliveiro-doctoral-dissertation-podcast-030315>

LINK: <https://soundcloud.com/markusmusic-1/bomoh-interview-2-tano-oliveiro-doctoral-dissertation-podcast-030315>

LINK: <https://soundcloud.com/markusmusic-1/bomoh-interview-3-felicity-oliveiro-doctoral-dissertation-podcast-030315>

LINK: <https://soundcloud.com/markusmusic-1/bomoh-interview-4-tano-oliveiro-doctoral-dissertation-podcast-030315>

Appendix B - Word Cloud Example



Appendix C - Word Cloud Example

Work	Download Link:
<i>WoodSource</i>	markoliveiro.com.au/dissertation/software/woodsource.html
<i>Bullroarer</i>	markoliveiro.com.au/dissertation/software/bullroarer.html
<i>Han(t)uman</i>	markoliveiro.com.au/dissertation/software/hantuman.html
<i>Tolak Balah</i>	markoliveiro.com.au/dissertation/software/tolakbalah.html
<i>Trance-TV</i>	markoliveiro.com.au/dissertation/software/trancetv.html

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PART II

THE BoMoH CYCLE

Full Theatrical Setting/Performance Score with Production Notes

THE BOMOH CYCLE

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from the BoMoH cycle

Component Composition

WOOD SOURCE

for keyboard instrumentalist and fixed-media electronics

by Mark Oliveira

WOOD SOURCE

dissertation topic keywords:

hypermedia, fixed-media audio, pitch-tracking

performance mode:

concert or theatrical setting

abstract:

Exploring the hypermedia document of Wood Source is a reflection of the act of the Child playing at/with the tree in the bush or jungle, the setting of the drama in this opera. This component composition is a simple expression of the experiential nature of this collection of conceptual images, and how those experiences can be brought to life utilizing a hypermedia design approach. Computer-human interaction provides an analogue to the image of a child at play near a tree, with the computer itself serving as a metaphor for the tree. This interactive environment can produce unexpected and bewildering artifacts for the user. This simple map of triggers, the still and seemingly lifeless image of the Wood Source interface is a facade for hidden veins and channels teeming with life, a vigour implied in the resultant audio media.

technical requirements:

The following technical items are necessary in order to stage a performance of Wood Source: a laptop of computational device, the max/MSP software v6 or later, a keyboard instrument or interface, a pair of condenser microphones if a live instrument is used. The following technical items are recommended for a performance of Wood Source: an audio interface, a theatrical spotlight with a yellow filter or gel, a small stand-light and music stand for the performer.

software:

The Wood Source component composition use a series pitch and amplitude tracking devices in order to structure, in real-time, sequences of fixed-media objects. The performer remixes a library of wooden sound objects by performing a sequence of pitches based on a modular score set. Sixty-six fixed media samples are hidden in a map of sound that must be explored using pitches and frequency bandwidths in the concert setting. This performance system was developed in max/MSP.

performance score:

The performance score developed for the Wood Source hypermedia system is a sequence of pitches and flourishes intended for realization by a keyboard instrumentalist. A wooden keyboard, such as the marimba, would match the aesthetic of the fixed media objects. Each pitch coupled with a fermata is a trigger note that should be emphasized in performance to ensure the pitch-tracking software is engaged to cue the next fixed-media object or event. The temporal, dynamic and expressive control of each pitch, or sequence of pitches, is left to the discretion of the performer. Excepting the flourish movement in each modular section of the score, the performer should pay attention to the fixed-media output, using their ears to structure the temporal patterns they apply, as they remix each fixed media object into the next. As many or as few as one of these modular pitch map scores can be used in a performance of Wood Source in the concert setting.

WOODSOURCE | PITCH MAP MOD #1

Use this sequence to trigger the various fixed media samples on the wood source map
Any timbre, any dynamic, any tempo; on any instrument (keyboard interface recommended)

Flourish: play as fast as possible (disregard sounding wood samples) -----| Trigger pitch: listen and remix woods using each pitch in this sequence

PITCH CYCLE

This section contains two staves of music. The first staff is a treble clef with a rapid sequence of notes, indicated by a dashed line and the instruction 'Flourish: play as fast as possible'. The second staff is a bass clef with a sequence of notes, also indicated by a dashed line. A vertical dashed line separates the flourish from the 'Trigger pitch' section, which consists of a sequence of notes in both staves.

PC.

This section contains two staves of music. The treble clef staff has a sequence of notes, and the bass clef staff has a sequence of notes. The notes are arranged in a specific sequence across the two staves.

PC.

This section contains two staves of music. The treble clef staff has a sequence of notes, and the bass clef staff has a sequence of notes. The notes are arranged in a specific sequence across the two staves.

WOODSOURCE | PITCH MAP MOD #3

Use this sequence to trigger the various fixed media samples on the wood source map

Trigger pitch: listen and remix woods using each pitch in this sequence

PITCH CYCLE

PC.

PC.

Flourish: play as fast as possible (disregard sounding wood samples) -----|

from the BoMoH cycle

Component Composition

BULLROARER

for Wii-remote, optional chant-verse and live-electronics

by Mark Oliveiro

BULLROARER

dissertation topic keywords:

interactivity, live-electronics, kompong rhythms, bullroarer, ritual, additive synthesis, granular synthesis

performance mode:

concert or theatrical setting

abstract:

The Bullroarer component work is an attempt to model a staging of the Indigenous Malay "main peteri", a cultural performance related to the divination and healing practices of the syncretic traditions of the Bomoh protagonist. During the course of the performance, the wii-remote operator embodies the character of the shaman as he communes with the spiritual world by way of commanding the sonic forces around him. In the act of swinging the wii-remote about the space, as a symbolic replacement for a traditional bullroarer wooden communicative instrument, the bomoh character commands the spirit world to entreat upon his needs.

technical requirements:

The following technical items are necessary in order to stage a performance of the Bullroarer: a laptop or computational device, a lapel or hands-free microphone, a wii-remote device, an extension string/rope for the wii-remote approx 3 feet, the max/MSP software v6 or later. The following technical items are recommended for a performance of the Bullroarer: an audio interface, a theatrical spotlight with a light-blue filter or gel, a small platform or chair from which the performer can elevate his/her position in order for the wii-remote to avoid striking the ground when swung.

software:

The Bullroarer component composition uses a variety of data-handling and live-synthesis techniques that convert the accelerometer data of a bluetooth human-interface device, known commercially as the Nintendo Wii-remote. This performance system was developed in max/MSP. Please see figure 9 for a screen shot of the performance system programmed in the max/MSP environment.

performance score:

The performance score of the Bullroarer component composition, is made up of two modular score types: three unique chants of Low Malay verse, each split into a three-part modular structure, and a graphic-notation gesture score that outlines the performance gestures of the wii-remote operator.

regarding performance structure:

The Bullroarer is a modular and remixable performance ritual, when performed as a part of the BoMoH chamber opera. Each numbered modular section of the graphic notation score can be played in any sequence at the discretion of the performer. Each segment of the chant verse is divided into three sections, labelled: L1, L2 and L3. In each of the numbered sections of the gestural score, a recommendation of where each line of the chant should be performed is listed atop the gestural notations. This chant verse is optional. The recommendations for where to perform the chant verse is also optional. The combination of chant and bullroarer sonification and gesture should feel natural

and inherent; thus, it is recommended that the performer memorize each of the simple chant lines, and place them, in three part segments, in sequence with whichever gestural segments the performer feels is appropriate and intuitive. Gestural and vocal input data is required in order for the performance system to continue to output live sound, once the performer stops their performance, the system will soon follow. Thus, the structure and duration of each performance is inexorably linked to the performance input of the interpreter. The speed or tempo of performance, as with all other indeterminate aspects of this work, is left to the discretion of the performer, however, the score indicates tempo modulations which should be considered when deciding upon the speed of the count.

performance notation guidelines:



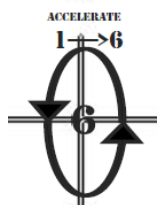
Rest or pause for one count.



Two full anticlockwise rotations of the bullroarer, for two counts.



Ten full clockwise rotations of the bullroarer, for ten counts.



Six clockwise rotations of the bullroarer, gradually accelerating over six counts.



A clockwise half swing over one count.



Reel in the bullroarer by the rope, grab the device in your hand/hands and shake the device violently, over nine counts.

Bullroarer

Bullroarer

WII-REMOTE GESTURE SCORE

a graphic score by mark oliveiro

FOR REVIEW ONLY

MOD #1 (BARU)

The image displays three staves of musical notation for a piece titled "MOD #1 (BARU)". Each staff begins with a treble clef. The notation includes notes, rests, and dynamic markings such as "ACCELERATE" and "DECELERATE".

Staff 1: Starts with the word "BARU" and the number "(3)". It contains four measures. The first measure is marked "ACCELERATE" and shows a note with a slur and an arrow pointing right, labeled "1" above and "2" below. The second measure is a single note "1". The third measure is marked "ACCELERATE" and shows a note with a slur and an arrow pointing right, labeled "1" above and "2" below. The fourth measure is marked "ACCELERATE" and shows a note with a slur and an arrow pointing right, labeled "1" above and "5" below. The word "CHANT L1" is written above the staff, and the number "9" is written below the note. The staff ends with a double bar line and repeat dots.

Staff 2: Starts with the word "BARU" and the number "(3)". It contains five measures. The first measure is marked "DECELERATE" and shows a note with a slur and an arrow pointing right, labeled "2" above and "8" below. The second measure is a single note "1". The third measure is marked "ACCELERATE" and shows a note with a slur and an arrow pointing right, labeled "1" above and "6" below. The fourth measure is a single note "1". The fifth measure is a single note "3".

Staff 3: Contains five measures. The first measure is marked "ACCELERATE" and shows a note with a slur and an arrow pointing right, labeled "1" above and "2" below. The second measure is marked "DECELERATE" and shows a note with a slur and an arrow pointing right, labeled "3" above and "9" below. The third measure is marked "ACCELERATE" and shows a note with a slur and an arrow pointing right, labeled "1" above and "2" below. The fourth measure is a single note "1". The fifth measure is marked "ACCELERATE" and shows a note with a slur and an arrow pointing right, labeled "1" above and "2" below.



!TREMBLE! ACCELERATE ACCELERATE !TREMBLE!

1 → 9 1 → 8 10 1

31 9 8 10 1 9



ACCELERATE !TREMBLE!

1 → 2 CHANT L2 CHANT L2

2 1 1 1 1 16

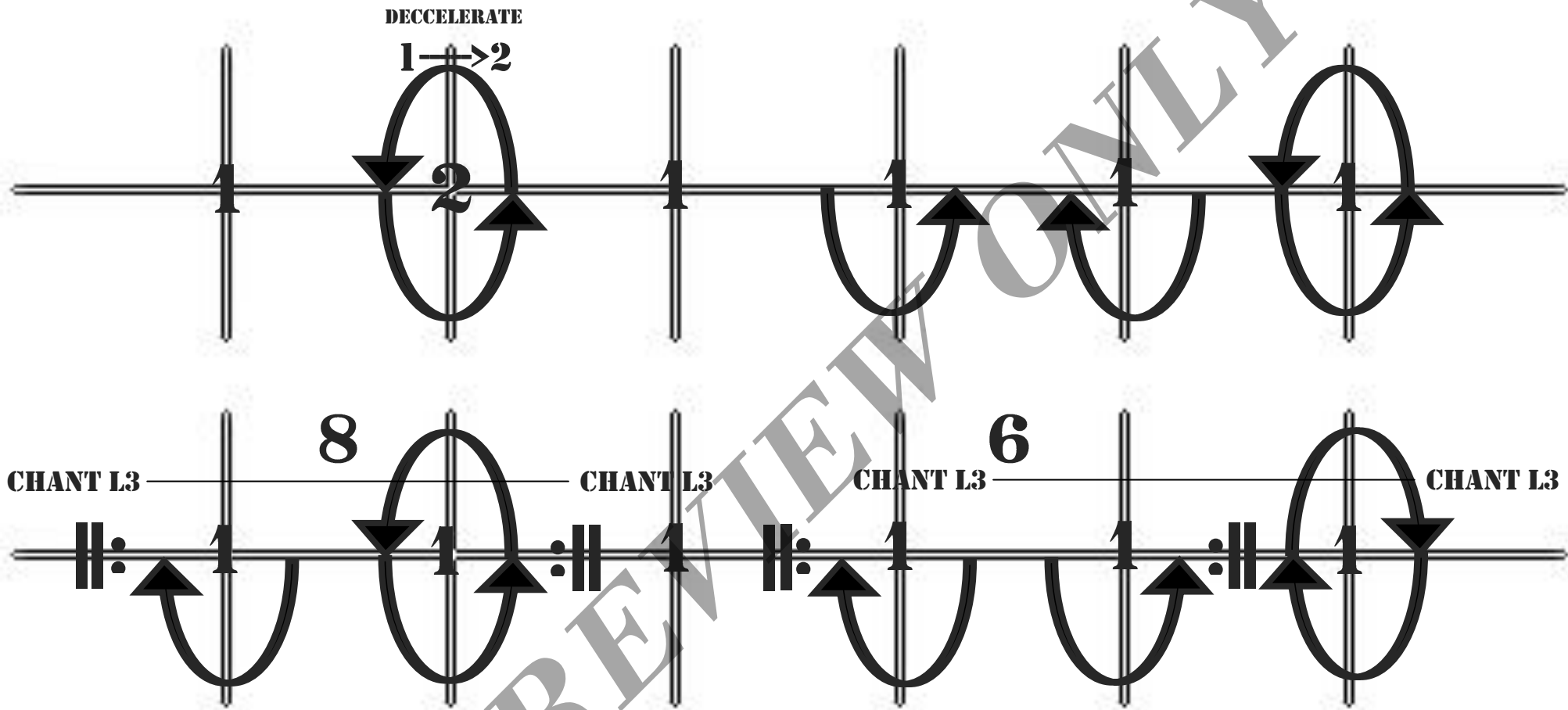


ACCELERATE DECELERATE ACCELERATE ACCELERATE !TREMBLE!

1 → 8 3 → 9 1 → 2 1 → 4

CHANT L3 CH L3 L3

16 9 8 4 7 9



MOD #3 (HADRAH)

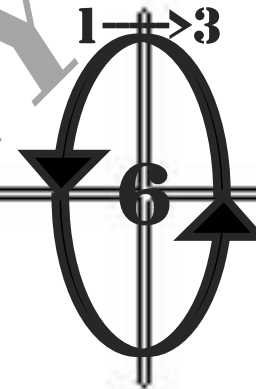
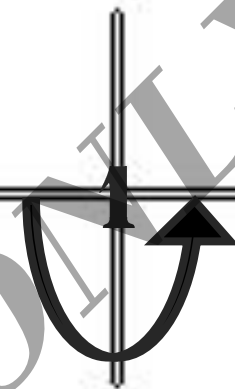
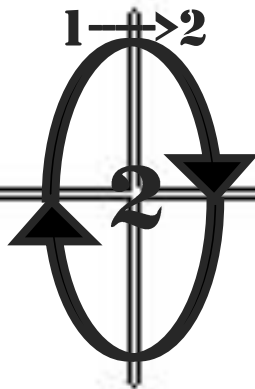
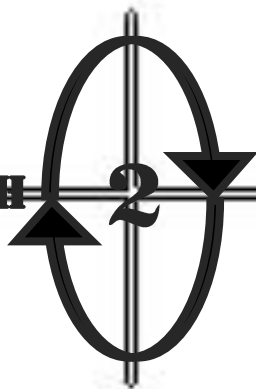
ACCELERATE

1 → 2

ACCELERATE

1 → 3

HADRAH
(2)



ACCELERATE

1 → 6

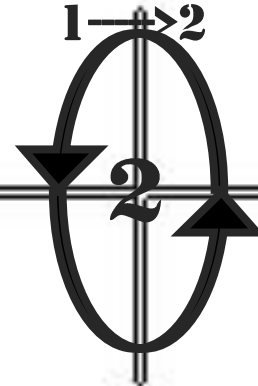
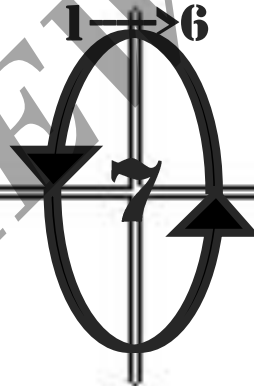
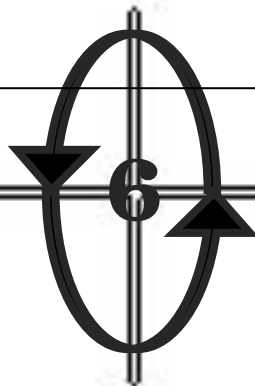
ACCELERATE

1 → 2

CHANT L1

CHANT L1

CHANT L2



ACCELERATE

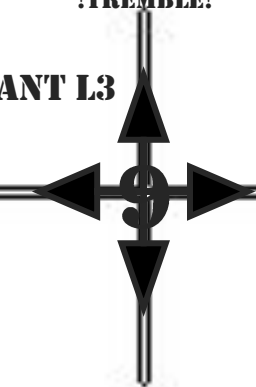
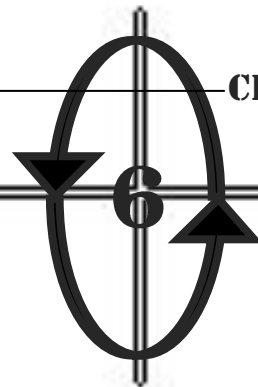
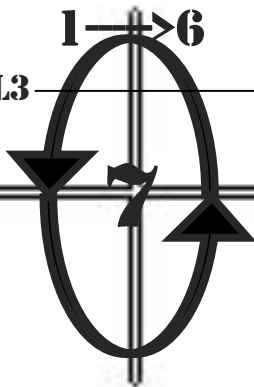
1 → 6

!TREMBLE!

CHANT L2

CHANT L3

CHANT L3



MOD #4 (KEPANG)

RH. KEPANG (3)

ACCELERATE
1 → 2

CHANT L1 4

CHANT L1

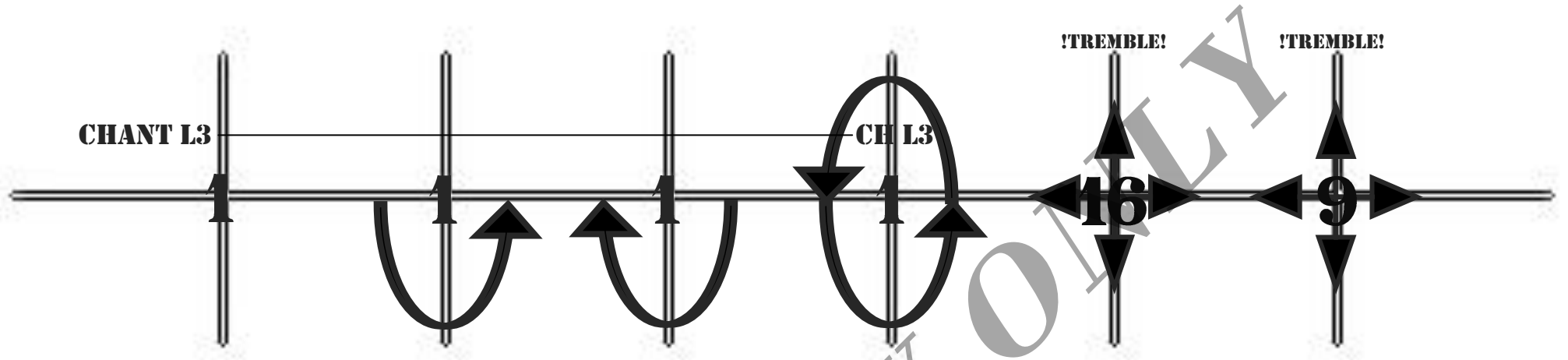
DECELERATE
1 → 7

CHANT L2 4

CHANT L2

!TREMBLE! 16

!TREMBLE! 9



FOR REVIEW ONLY

Bullroarer

OPTIONAL CHANT SCORE

score by mark oliveiro

FOR REVIEW ONLY

BOMOH CHANT MOD #1

(Petras - "the sight")

CHANT L1

[mm-----] pe — tra — [ss-----]

(Petrus - "the sound")

CHANT L2

[mm-----] pe — tru — [ss-----]

(Adoi - "the pain") (Amboi - "the pleasure")


CHANT L3

a — doi! a — [mm-----] boi!

BOMOH CHANT MOD #3

(Bismillah doa selamat - "In Gods name we ask for luck.")

CHANT L1




Bis — mil lah! ————— d-oa ——— [mm-----]sa-la-mat!

The musical notation for Chant L1 is written on a single staff in treble clef. It begins with a treble clef, a key signature of one sharp (F#), and a common time signature (C). The melody starts with a quarter note G4, followed by quarter notes A4 and B4. A whole note C5 is held for two measures. The melody then descends: quarter notes B4, A4, and G4, followed by a quarter note F#4. A half note G4 is held for two measures. The piece concludes with quarter notes A4 and B4, and a final quarter note C5 marked with an accent (^).

(Boleh-lah kita berjumpa - "Can we come to you.")

CHANT L2

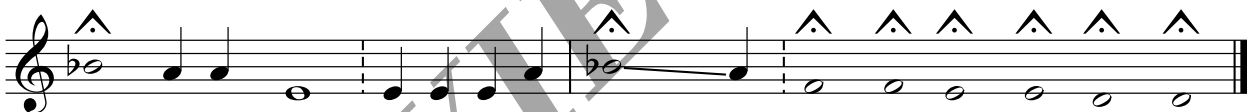


Bo — leh lah! ————— ki-ta ——— ber ——— jum-pa!

The musical notation for Chant L2 is written on a single staff in treble clef. It begins with a treble clef, a key signature of one sharp (F#), and a common time signature (C). The melody starts with a quarter note G4, followed by quarter notes A4 and B4. A whole note C5 is held for two measures. The melody then descends: quarter notes B4, A4, and G4, followed by a quarter note F#4. A half note G4 is held for two measures. The piece concludes with quarter notes A4 and B4, and a final quarter note C5 marked with an accent (^).

(Minta-lah berjalan hormat, orang sakit hendak ubat! - "Guide us, the sick need help!")

CHANT L3



Min — ta - lah ber — ja - lan hor-mat, or ——— rang sa - kit hen - dat u - bat.

The musical notation for Chant L3 is written on a single staff in treble clef. It begins with a treble clef, a key signature of one flat (Bb), and a common time signature (C). The melody starts with a quarter note G4 marked with an accent (^), followed by quarter notes A4 and B4. A whole note C5 is held for two measures. The melody then descends: quarter notes B4, A4, and G4, followed by a quarter note F4. A half note G4 is held for two measures. The piece concludes with quarter notes A4 and B4, and a final quarter note C5 marked with an accent (^).

Component Composition

HAN(T)UMAN FACE-DANCE

for performance artist, live-video and electronics

by Mark Oliveira

HAN(T)UMAN FACE DANCE

dissertation topic keywords:

interactivity, projected reality, eye-tracking, bio-sensing, video tracking, webcam ritual, live-electronics, word score, word cloud, performance art

performance mode:

concert or theatrical setting

abstract:

The Han(t)uman Face-Dance is an exploration of a central theme of the BoMoH chamber opera: concepts of hostile spiritual possession and the ritual such belief systems inspire. The opera's secondary protagonist, a preschool-aged boy, is possessed by a spirit once housed in body of a malevolent tree. Utilising a number of new media concepts including, augmented reality and word-clouds. The users face-instrument is used to control the parameters of the performance system. In this possession model component composition, projected reality and granular synthesis is used to create a sense of "otherness" when combined with the live presence of the performance artist. The title of this performance art work for computer, human face-instrument and projection is a conflation of the malay word for spirit "hantu" and a central character from the Hindi Ramayana, "Hanuman" (a monkey deity).

technical requirements:

The following technical items are necessary in order to stage a performance of the Han(t)uman: a laptop or computational device, a lapel or hands-free microphone, a pair of studio headphones, a webcam device, the max/MSP software v6 or later, a projector and screen. The following technical items are recommended for a performance of the Han(t)uman: an audio interface, a theatrical spotlight with a yellow filter or gel, a small stand-light to brighten the face of the performer so the webcam can track the performers eyes.

software:

The Han(t)uman component composition uses a variety of data-handling and live-synthesis techniques that convert the eye-tracking data of the webcam and software into musical and visual output. This performance system was developed in max/MSP. Please see figure 10 for a screen shot of the performance system programmed in the max/MSP environment.

performance score:

The performance score of the Han(t)uman Face-Dance, is provided for the performance artist as a cyclical and modular audio feed. Based on a series of recordings, a word score, a cycle of modular instructions and commands are output to the headphones of the performance artist, from which all performance instructions flow. A transcript of the audio feed is listed as a score in the pages to follow.

regarding performance structure:

The Han(t)uman is a modular and remixable performance, when performed as a part of the BoMoH chamber opera. The performer has no input as to the flow, structure or order of the performance,

except for the option to turn the machine "off", thus deciding when the performance commences and concludes. The only performance score required is a transcript of the audio feed. A pre-recorded word score provides the performance artist with instructions pertaining to performance action. These include the following categories: hear and respond, follow an object with the eyes, find eyes and repeat with the mouth, and internalize and respond. Some of these instructions are intentionally vague, resulting in the only chaotic element within this performance system, in which the computer instructs the actions of the human performer. The performance system engages with all performance action, and the system will continue to remix the modular material, the output and the performance instructions output to the performers headphones.

FOR REVIEW ONLY

"HAN(T)UMAN FACE-DANCE"

"HAN(T)UMAN FACE-DANCE"

WORD-SCORE:

*(CH#) - Taken from the Shri Hanuman Chalisa: <http://www.hanuman.com/cha.html>

###INTRODUCTION INSTRUCTIONS###

###NARRATOR SPEAKS ALL TEXT OUTSIDE (), THOUGH INCLUDING []###

###MODULAR SECTION ZERO###

###RITUAL PREPARATION###

###NARRATOR SPEAKS ALL TEXT ###

WELCOME(!)

(CH40) All those who recite [the] Hanuman Chalisa (...)
(...) are sure to be [saved].

(CH10) You are an ardent listener, always so keen to listen to the
narration of [this performance rite]. Your [mind] is filled with
what [you hear in our words]. You therefore always [perform as instructed].

(CH5) With Limbs as sturdy as ([a steel] mace (...))
you are [stoic]and [still]. On you attends [an obedience]
(...). You [cannot resist the] darkness of [these] evil thoughts.

ATTEND(!)

ATTEND(!)

ATTEND(!)

Stoic and still.

Stoic and still, sturdy as a steel

ATTEND(!)

ATTEND(!)

ATTEND(!)

###MODULAR SECTION ONE###

###EYE'S BLINK###

###NARRATOR SPEAKS ALL TEXT ###

Shut your eyes(!)
Open your eyes(!).
Shut them, open.
Shut them, open. Shut. Open.
Shut them, blink. Shut. Open, shut. Blink, flutter!
Shut them.
Open.
Shut them.
Open.
Shut them, blink.
Shut them, open. Shut. Open.
Shut them, open. Shut. Open, shut. Flutter!
Shut them.
Open.

###MODULAR SECTION TWO###

###EYE'S BLINK###

###NARRATOR SPEAKS ALL TEXT ###

Shut your eyes, open(!)
Open your eyes, shut(!).
Shut them, open them.
Shut them, open them.

Shut.

Shut.

Open.
Shut!

Open them, blink.
Shut.

Open, shut.

Blink, flutter!
Blink, blink, blink, blink, blink, blink, shut!

Flutter, shut, blink, blink, blink, blink, shut!

Flutter, shut!

###MODULAR SECTION FOUR###

###EYE'S SEARCH AND MOUTH MUTTERS###

###NARRATOR SPEAKS ALL TEXT NOT WITHIN (), THOUGH INCLUDING []###

(CH33) You possess the power of devotion to [follow]...

(CH15)Thousands of living beings are chanting hymns of [recitation]...

(CH26) All diseases, pain and suffering disappear on reciting regularly
(...) Han[t]uman's (...) name.

(WORD CLOUD IMAGE WILL LOAD AUTOMATICALLY)

Find and perform: "GRUNT"

Find and perform: "MOAN"

Find and perform: "SQUEAK"

Find and perform: "BOOM"

Find and perform: "TRILL"

Find and perform: "LOW, GUNT, HOOT"

Find and perform: "MOAN"

Find and perform: "SQUEAK"

Find and perform: "GRUNT"

Find and perform: "HOOT"

Find and perform: "TRILL"

Find and perform: "SCREAM"

Find and perform: "SHARP, SHORT, SNEEZE, SQUEAK"

Find and perform: "SCREAM"

Find and perform: "SHARP, TRILL, MOAN, SQUEAK"

Find and perform: "CALL, BOOM, SNEEZE"

Find and perform: "TWITTERTRILL"

Find and perform: "TRILL"

Find and perform: "LOW, BOOM"

Find and perform: "SHARP, CALL"

Find and perform: "SHORT, TRILL"

Find and perform: "SQUEAK"

Find and perform: "TWITTERTRILL"

Find and perform: "TRILL" - "BOOM" - "MOAN" - "SQUEAK" - "GRUNT" - "SNEEZE" - "SCREAM"

Find and perform: "TRILL" - "TRILL" - "GRUNT" - "SQUEAK" - "TRILL" - "TRILL" - "SQUEAK"

Find and perform: "TRILL" - "HOOT" - "LOW" - "GRUNT" - "HOOT" - "BOOM" - "TWITTER"

Find and perform: "GRUNT" - "SCREAM"

###MODULAR SECTION FIVE###

###EARS FOLLOW###

###NARRATOR SPEAKS ALL TEXT NOT WITHIN (), THOUGH INCLUDING []###

(CH33) You possess the power of devotion to [rage]...

(CH22) You are the sentry at the door of [the] Divine (...)
[The spirit] can enter (...) without your permission,

(CH25) All the ghosts, demons and evil forces keep (...) with the
sheer mention of your great name, [O'Han(t)uman]!

Internalize and respond at will: "1, 2, 1, 1, 1, 1, 2, 1, 2, 1..."

Internalize and respond at will: "2, 1, 2, 1, 1, 6, 1, 6, 1, 7, 2, 1, 1, 2, 1, 6, 7, 2, 1, 1, 1, 1..."

Internalize and respond at will: "1, 1, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1..."

Internalize and respond now: "1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1..."

Internalize and respond at will: "1, 2, 1, 1, 1, 1, 1, 2, 1, 2, 1, 0, 0, 0..."

Internalize and respond at will: "1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1..."

Internalize and respond at will: "1, 1, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1..."

Internalize and respond now: "1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1..."

Internalize and respond at will: "1, 2, 1, 1, 1, 1, 1, 2, 1, 2, 1..."

Internalize and respond at will: "2, 1, 2, 1, 1, 7, 9, 6, 1, 7, 2, 16, 1, 2, 1, 5, 7, 2, 21, 1, 1, 1..."

Internalize and respond at will: "1, 1, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1..."

Internalize and respond now: "1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1..."

Internalize and respond at will: "1, 2, 1, 1, 1, 1, 1, 2, 1, 2, 1..."

Internalize and respond at will: "2, 1, 2, 1, 1, 8, 1, 5, 1, 8, 2, 1, 3, 2, 1, 5, 8, 2, 1, 2, 3, 1..."

Internalize and respond at will: "1, 2, 1, 1, 1, 3, 1, 1, 1, 5, 8, 1, 1, 1, 2, 3, 1, 1, 5, 1, 1, 8..."

Internalize and respond now: "1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1..."

Component Composition

TOLAK BALAH

for keyboard instrumentalist, video and fixed-media electronics

by Mark Oliveira

TOLAK BALAH

dissertation topic keywords:

responsive model, interactivity, remixability, live electronics, fixed-media video, amplitude-tracking

performance mode:

concert or theatrical setting

abstract:

The Tolak Balah is a ritual model component composition of the BoMoH cycle, and a multimedia live remix performance system that responds to live input of a keyboard interface user. Two opposing video streams of the Tolak Balah performance system are compilations of a variety of smaller visual media modes selected from the supplemental media library. Additionally, twenty-four (24) continuous audio streams are remixed live via a variety of performance input-data handling techniques. The performer's input effects the mix between the video and audio streams in real-time. The performer's responsibility is to find a balance in the remix of media, first by correctly performing each musical mantra or mod, and then in the act of selecting the next mod that is best for performance in any sequence of the Tolak Balah. The ritual of performance in this component composition is representative of the image of the Bomoh at prayer, attempting to command the entities of his pantheistic world to serve in an "intervention [into] human life." This pantheon of cultures, rites and spiritual forces is mirrored in the variety of media objects that are encased in each of the fixed streams.

technical requirements:

The following technical items are necessary in order to stage a performance of Tolak Balah: a laptop of computational device, the max/MSP software v6 or later, a keyboard instrument or interface, a pair of condenser microphones if a live instrument is used, a video projector and screen. The following technical items are recommended for a performance of Tolak Balah: an audio interface, a theatrical spotlight with a red filter or gel, a small stand-light and music stand for the performer, a video monitor so the performer can monitor the video output as they perform the Tolak Balah rite.

software:

The Tolak Balah component composition uses a series of amplitude or velocity tracking devices in order to structure, in real-time, the mix between twenty four tracks of fixed-media audio, and two streams of video data. The performer remixes the various media of the system by the various amplitude or velocity values input to the system. The performance systems video stream has a fixed durational output, thus, the output sequence will continue for approximately 7 minutes and 20 seconds. This performance system was developed in max/MSP.

performance score:

The performance score developed for the Tolak Balah remix system, is a sequence of performance gestures and flourishes intended for realization by a keyboard instrumentalist. A wooden keyboard, such as the marimba, would match the aesthetic of the cultural aesthetic of this work. Each of the modular sections, one page a piece, can be set in any order within their unit. The three modular units are related to the basic structure of a narrative, beginning, middle and end. In any performance of the Tolak Balah the performer should select/perform one or more of the beginning modules, then a one, or more, of the middle module, and finally, one or more, of the end modules. Each module is notated in an indeterminate rhythmic and pitch notation. Each staff represents a hexachord, one in a low, and

the other in a higher octave. The middle staff is a collection of three found objects that the performer can select at their discretion. The rhythmic notation on each staff is relative, though the tempo can be applied with a sensitivity to the dynamic markings, where provided. "Some tempo change markings are indicated, suggesting fluctuations in the relative speed of the performer's gestures. The performance systems video stream has a fixed output, thus, the performer must select a sequence of notational modules that matches the duration of the video stream: approximate 7 minutes and 20 seconds.

FOR REVIEW ONLY

(START MOD #1)

FREELY WITH FLAMBOYANT EXPRESSION; START SLOW, ACCELERATE THROUGHOUT...

HIGH OCTAVE (STREAM #1)

LOW OCTAVE (STREAM #2)

sfz *sfz* *sfz*

ff

sfz *sim** *f* *sfz* *ff* *mp* *p*

fff *p* *f* *ffff*

(START MOD #2)

FREELY WITH FLAMBOYANT EXPRESSION; START FRANTICALLY, THEN SLOW GRADUALLY THROUGHOUT...

HIGH OCTAVE
(STREAM #1)

LOW OCTAVE
(STREAM #2)

Musical score for High Octave (Stream #1) and Low Octave (Stream #2). The High Octave part features a series of diamond-shaped notes with stems, starting with a dynamic of *p* and moving to *ff* and *f*. The Low Octave part features diamond-shaped notes with stems, starting with a dynamic of *ff* and moving to *sfz*, *f > < f*, *p*, and *sfz*. Dynamics include *p*, *ff*, *f*, *sfz*, *mp*, *f > < f*, *p*, and *sfz*.

Musical score for High Octave (Stream #1) and Low Octave (Stream #2). The High Octave part features a series of diamond-shaped notes with stems, starting with a dynamic of *p < f* and moving to *mp* and *ff*. The Low Octave part features diamond-shaped notes with stems, starting with a dynamic of *sfz* and moving to *f > mp*, *f*, *sfz*, *mp*, *fff*, and *fffz*. Dynamics include *p < f*, *mp*, *ff*, *sfz*, *mp*, *fffz*, *sfz*, *f > mp*, *f*, *sfz*, *mp*, *fff*, and *fffz*.

(MID MOD #1)

LOOP/REPEAT AD. LIB

HIGH OCTAVE
(STREAM #1)

Musical notation for High Octave (Stream #1) showing a continuous sequence of eighth notes across multiple staves. The notes are beamed together in groups of four, creating a dense, rhythmic texture. The notation is spread across several staves, with vertical lines indicating the continuation of the stream.

LOW OCTAVE
(STREAM #2)

Musical notation for Low Octave (Stream #2) showing a sparse sequence of notes across multiple staves. The notes are represented by diamond-shaped markers on a few staves, with vertical lines indicating the continuation of the stream. The notation is spread across several staves, with vertical lines indicating the continuation of the stream.

FOR REVIEW ONLY

(MID MOD #2)

LOOP/REPEAT AD. LIB

HIGH OCTAVE
(STREAM #1)

LOW OCTAVE
(STREAM #2)

The musical score is divided into two parts: 'HIGH OCTAVE (STREAM #1)' and 'LOW OCTAVE (STREAM #2)'. The High Octave part features a continuous sequence of eighth notes across the entire duration. The Low Octave part features a sequence of diamond-shaped notes, with some notes marked with a slash. A large watermark 'FOR REVIEW ONLY' is overlaid diagonally across the score.

(MID MOD #3)

LOOP/REPEAT AD. LIB

HIGH OCTAVE
(STREAM #1)

The musical score consists of two staves. The top staff, labeled 'HIGH OCTAVE (STREAM #1)', contains a continuous sequence of eighth notes, each with a triplet of beams. The bottom staff, labeled 'LOW OCTAVE (STREAM #2)', contains a sequence of notes with stems pointing downwards, including diamond-shaped notes. A large watermark 'FOR REVIEW ONLY' is overlaid diagonally across the score.

LOW OCTAVE
(STREAM #2)

FOR REVIEW ONLY

(MID MOD #4)

LOOP/REPEAT AD. LIB

HIGH OCTAVE
(STREAM #1)

The musical score consists of two staves. The top staff, labeled 'HIGH OCTAVE (STREAM #1)', contains a continuous sequence of eighth notes across three measures. The bottom staff, labeled 'LOW OCTAVE (STREAM #2)', contains a sequence of notes with stems pointing upwards, including diamond-shaped notes, across three measures. Vertical lines connect the notes in the two staves, indicating their relationship. A large watermark 'FOR REVIEW ONLY' is overlaid diagonally across the entire score.

LOW OCTAVE
(STREAM #2)

(MID MOD #5)

LOOP/REPEAT AD. LIB

HIGH OCTAVE (STREAM #1)

LOW OCTAVE (STREAM #2)

(MID MOD #6)

FROM EXPLOSIVE, BECOME GRADUALLY SOFTER AND FASTER

HIGH OCTAVE
(STREAM #1)

|| (W)

|| (W)

LOW OCTAVE
(STREAM #2)

|| (P)

ppppp

fff

(MID MOD #7)

FROM EXPLOSIVE, BECOME GRADUALLY SOFTER AND FASTER

HIGH OCTAVE
(STREAM #1)

LOW OCTAVE
(STREAM #2)

The musical score consists of two staves. The upper staff, labeled 'HIGH OCTAVE (STREAM #1)', contains a single double bar line. The lower staff, labeled 'LOW OCTAVE (STREAM #2)', contains a sequence of six notes. The notes are marked with square stems and are positioned on the first, second, and third lines of the staff. The first note is on the first line, the second on the second line, the third on the third line, the fourth on the second line with a slur and a small 'x' above it, the fifth on the first line, and the sixth on the second line. A thick black wedge-shaped graphic is drawn under the notes, starting wide at the beginning and tapering to a thin line at the end, indicating a gradual decrease in volume and an increase in speed. The dynamic marking *ppppp* is placed below the first note, and *ffff* is placed below the final note.

FOR REVIEW ONLY

(MID MOD #8)

PLAY ALL CHORDS DRAMATICALLY, WITH A
GRAND REFLECTIVE PAUSE INBETWEEN

HIGH OCTAVE
(STREAM #1)

Musical staff for High Octave (Stream #1). It begins with a double bar line and a '(P)' dynamic marking. The staff contains several diamond-shaped chord symbols and a few notes, including a quarter note with a slur and a half note.

Musical staff for the middle octave. It begins with a double bar line and a '(P)' dynamic marking. The staff contains a variety of notes, including a quarter note with a slur, a half note, and a quarter note with a slur.

LOW OCTAVE
(STREAM #2)

Musical staff for Low Octave (Stream #2). It begins with a double bar line and a '(P)' dynamic marking. The staff contains several diamond-shaped chord symbols and notes, including a quarter note with a slur and a half note.

FOR REVIEW ONLY

(MID MOD #9)

PLAY ALL CHORDS DRAMATICALLY, WITH A GRAND REFLECTIVE PAUSE INBETWEEN

HIGH OCTAVE
(STREAM #1)

Musical notation for the High Octave (Stream #1) part. It consists of two staves. The first staff has a double bar line with a 'P' (Percussion) symbol. The second staff contains a diamond-shaped symbol, a slur over a diamond, and a diamond. There are also some horizontal lines and dots on the staff.

Musical notation for the middle section, consisting of a single staff. It starts with a double bar line and a 'P' (Percussion) symbol. The staff contains several notes with stems, some with flags, and a diamond-shaped symbol. There are also some horizontal lines and dots on the staff.

LOW OCTAVE
(STREAM #2)

Musical notation for the Low Octave (Stream #2) part. It consists of two staves. The first staff has a double bar line with a 'P' (Percussion) symbol. The second staff contains a diamond-shaped symbol, a slur over a diamond, and a diamond. There are also some horizontal lines and dots on the staff.

FOR REVIEW ONLY

(END MOD #1)

FREELY WITH FLAMBOYANT EXPRESSION; START SLOW, ACCELERATE THROUGHOUT...

HIGH OCTAVE (STREAM #1)

LOW OCTAVE (STREAM #2)

sfz *sfz* *sfz*

ff

sfz *sim** *f* *sfz* *ff* *mp* *p* *f* *ffff*

(END MOD #2)

FREELY WITH FLAMBOYANT EXPRESSION; START FRANTICALLY, THEN SLOW GRADUALLY THROUGHOUT...

HIGH OCTAVE (STREAM #1)

LOW OCTAVE (STREAM #2)

p *ff* *f* *sfz* *mp* *ff* *sfz* *f > f* *p* *sfz*

p < f *mp* *ff* *mp* *sfz* *sfz* *mp* *sfz* *fff* *sfz* *f > mp* *< f* *sfz* *fff* *sfz*

Component Composition

TRANCE-TV

for performance artist, live-video and electronics

by Mark Oliveira

TRANCE-TV

dissertation topic keywords:

hypermedia, video installation, kompong rhythms, modular media, remixability, interdisciplinary

performance mode:

concert or theatrical setting

abstract:

Trance-TV is an exploration of a central theme of the BoMoH chamber opera: an immersive media that brings about an altered state of consciousness . This metaphor refers to the supernatural world of the Bomoh's belief system, and the act of performing a Trance rite in order to commune with the spirits. According to the source interviews for BoMoH, in Japanese occupied Singapore cinematic and theatrical presentations were used by the military to find and coerce the native populace into labour camps. Trance-TV is a mash-up of distractingly disjunct video segments set to the pulsations of a the malaysian tradition of kompong. In this mass media commentary, glitch-inspired video effects, iterative rhythms with modulating timbres and rhythmic visualisation is used to create a sensory overload in the audience and user.

technical requirements:

The following technical items are necessary in order to stage a performance of Trance-TV: a laptop of computational device, a wire mouse-device, the max/MSP software v6 or later, a projector and screen. The following technical items are recommended for a performance of Trance-TV: an audio interface, a theatrical spotlight with a green filter or gel, a spot light to follow the movements of a solo dancer/movement artist.

software:

The component composition Trance-TV is modeled as a linear-branching hypermedia document of seventy-two (72) fixed presets of modulating discrete media objects .This library of step-sequenced media are feature in precomposed audio and randomized visual manifestations. Some live post processing occurs through the process of stepping through the fixed sequence of the performance system. Please see figure 11 for a screen shot of the performance system programmed in the max/MSP environment.

performance score:

The performance score of Trance-TV is an experiment in using new media for an interdisciplinary approach. The natural performance art manifestation of the "trance" concept, is found in movement based arts. The experience of the "trance-state" requires physical exertion, and the complex streams of on-demand social media video documents found in this score, suggest a rigorous performative element to this setting. Each hyperlink in the performance score is a suggestion of a series of choreographic images that can be adapted by the performer as they use the wireless mouse device to advance through the seventy-two (72) presets of the hypermedia performance document. Thus, Trance-TV is a truest form of hypermedia document in this chamber opera, as it links hypertext to a complex multimedia library.

regarding performance structure:

The performance structure of this hypermedia document, score and performance system, is fixed. The performer, as a movement artist, is at liberty to freely reinterpret the hypertext performance score, and can greatly affect the temporal structure of the entire performance, however, every step of the sequence is in a fixed order. The unpredictability of the temporal structure is mirrored by the randomization of the fixed video objects, in their discrete, modular format.

FOR REVIEW ONLY

###CLICK THE WIRELESS-MOUSE TO ADVANCE THE PERFORMANCE SYSTEM###

###CLICK THE HYPERLINK TO VIEW EACH DANCE-VIDEO DOCUMENT"

TRANCE-TV

HYPERTEXT PERFORMANCE SCORE

CUE (#)

HYPERLINK

- (1) <https://www.youtube.com/watch?v=alNwApmGRxs>
- (2) As above.
- (3) As above.
- (4) As above.
- (5) <https://www.youtube.com/watch?v=JItkRLVlf-c>
- (6) As above.
- (7) As above.
- (8) <https://www.youtube.com/watch?v=dGeZKDcn5eU>
- (9) As above.
- (10) As above.
- (11) As above.
- (12) <https://www.youtube.com/watch?v=9ms7MGs2Nh8>
- (13) As above.
- (14) As above.
- (15) As above.
- (16) As above.
- (17) As above.
- (18) As above.
- (19) As above.
- (20) As above.
- (21) As above.
- (22) As above.
- (23) As above.
- (24) As above.
- (25) <https://www.youtube.com/watch?v=eKfD0i6oryA>
- (26) As above.
- (27) https://www.youtube.com/watch?v=8n9Gt_b8ARM
- (28) As above.
- (29) As above.
- (30) As above.
- (31) As above.
- (32) As above.
- (33) https://www.youtube.com/watch?v=8n9Gt_b8ARM (same document).
- (34) As above.

- (35) As above.
- (36) <https://www.youtube.com/watch?v=QOISCBRmfWY>
- (37) <https://www.youtube.com/watch?v=X-qGQ9ZWex0>
- (38) <https://www.youtube.com/watch?v=QOISCBRmfWY>
- (39) <https://www.youtube.com/watch?v=X-qGQ9ZWex0>
- (40) As above.
- (41) As above.
- (42) As above.
- (43) <https://www.youtube.com/watch?v=zb5yaTuuhLA>
- (44) As above.
- (45) As above.
- (46) <https://www.youtube.com/watch?v=n9tkq1yzcg0>
- (47) As above.
- (48) <https://www.youtube.com/watch?v=zb5yaTuuhLA>
- (49) As above.
- (50) <https://www.youtube.com/watch?v=n9tkq1yzcg0>
- (51) As above.
- (52) As above.
- (53) <https://www.youtube.com/watch?v=Vhof9Spb6es>
- (54) As above.
- (55) As above.
- (56) As above.
- (57) As above.
- (58) As above.
- (59) <https://www.youtube.com/watch?v=64VYOfiNC1U>
- (60) As above.
- (61) As above.
- (62) As above.
- (63) As above.
- (64) <https://www.youtube.com/watch?v=dGeZKDcn5eU>
- (65) As above.
- (66) <https://www.youtube.com/watch?v=9ms7MGs2Nh8>
- (67) As above.
- (68) As above.
- (69) As above.
- (70) <https://www.youtube.com/watch?v=JItkRLVif-c>
- (71) As above.
- (72) <https://www.youtube.com/watch?v=9ms7MGs2Nh8>

long form media object
supplemental media library
VOCAL SCORE

Syncretic Motet

Mark Oliveiro

Slow and reverent

♩ = ?

BOMOH (Baritone)

Han-tu han-tu han-tu bo-leh

mp

(Soprano)

(Mezzo-Soprano)

Di - a!

f p

mf

Steady, mechanical

A - ng

(Tenor)

Mes -

mf

ti.

A - ng

(Bass)

A - ng

5

lah.

Bird-call like

mp

f

k - at k - at k - at k - at

kat

Steady, mechanical

Jan - ng - gan

Jan - ng - gan

Jan - ng - gan

Jan - ng - gan

mp

10 $\text{♩} = 105$

Han-tu han tu han tu han tu — . Ge-lap! Bong Som

f

Su - dah-lahgam at lah Su dah lah gam at-lah O - Po -

f

Su - dah lahgam at lah Su dah lah gam at-lah

f

Bong Som bong

f *mf*

Som bong Som bong

f *mf*

14 $\text{♩} = ?$

choh! — — — — —

mp

bu - kan!

mp

Bo — — — — —

mp

bu - kan!

mp

Bo — — — — —

mp

bu - kan!

mp

Bo — — — — —

mp

bu - kan!

fp *sfz*

Ka - yu a - pi gua lu ma - ti bol -

mp *mf*

♩ = 80

19

Han-tu han-tu han-tu bo-leh - Han-tu han-tu han-tu bo-leh, Han-tu han-tu han-tu bo-leh to long! _____

mp _____ *mf* _____ *mp* _____ *mf* _____

leh _____ to - - - long - - - lah! _____

p _____ *mp* _____ *mf* _____

leh _____ to - - - long - - - lah! _____

p _____ *mp* _____ *mf* _____

8 leh _____ to - - - long - - - lah! _____

p _____ *mp* _____ *mf* _____

leh _____ to - - - long - - - lah! _____

p _____ *mp* _____ *mf* _____

♩ = ?

23

Le _____

p _____

Le - - - trum _____

p _____

Le - - - trum _____

p _____

Le - - - trum _____

p _____

rall. _____

Ba-las di - a mes - ti ang-kat, ki - ta fa - ham ker - ja a - wak. _____ Han tu ge-lap jan gang, som -

_____ *mp* _____ *mf* _____ *mp* _____

♩ = 105

28

A - yoh! Bu - kan

Ma-li-chan Su - dah lahgam at lah. Su - dah lahgam at lah a - yoh! Su

Ma- li Su - dah lahgam at lah. Su - dah lah gam - at lah a - yoh! Su

Bu - kan a - yoh!

bong Bu - kan a - yoh!

♩ = ?

33

dah lahgam at- lah Su - dah lah gam - at - lah. A - yoh lah, hoi.

dah lahgam at- lah Su - dah lah gam - at - lah. A - yoh lah, hoi.

Ti - dak, ti - dak. Bu - kan, A - yoh hoi.

Ti - dak, ti - dak. Bu - kan, A - yoh hoi.

36 *tr* *tr* *tr* *tr*

ff *f*

Rhythmic unison

Bo-leh to long han tu, han - tu. Jan-gang som bong han-tu, han-tu!

mf *ff*

40

Soloistic, dramatic (heavy vibrato ad. lib)

Per-tas, Pu - tus,a - doi, am - boi!

mp *f*

O - po - choh le - trum - oh.

f *p*

Harsh, aggressive whisper

sum-pah!

sum - pah!

f mp *ffz*

Sum - pah - lah.

Sum-pah- lah.

mp *mp*

43

De - de-buk _____ De bung ma - li - chan, a - yoh! _____
mp *mf*

Lu - ma - ti, ma - ti sum-pah ma-li- chun _____ Ka-ay-yu _____
mp

Frantic hushed whisper
Rhythm ad.lib (fast)

Sum-pah _____
 Sum-pah _____

46

A - yoh! _____ Sum-pah lu ma ti. _____
mp *mf*

a _____ a - pi - g - ua _____

a - pi _____
mp

Sum - pah, Sum - pah! _____
 Sum - pah, Sum - pah! _____

Solo, free and expressive (adhan' like wail)

51

[Bis - mil - lah!] _____
f

wide vib. *non- vib.* *sffz*
close-vib.

54

56

[Bis - mil - lah!]

58

60

[Bis - mil - lah!]

SINE WAPER

63

do - a!

66

[Bis - mil - lah!] Do a!

70

[Sal - la - mat!] [Bol - leh - lah]

Ki
mp

Ki
mp

74

Ki - ta Ber - jum - pa

8

ta Ki - ta.

ta Ki - ta.

78

Mi - i - in - ta - lah!

Fa fa - ham. fa ham ker - ja

Slow, reverent (echo of the adhan)

Jan-gang som bong ge-lap han-tu, han-tu, han-tu, han-tu ja

Fa ker - - - ja!

Fa ker - - - ja!

81

[Ber - ja - lan]

83

Hor - or - or mat.

ja

ja

ja

ja

ja

ja

86

Or - ang si

Han-tu,han-tu,han-tu,han - tu, ge la - ap.

A - wak!

Ba - las

A - wak!

Ba - las

A - wak!

Ba - las

90

— kit hen - - dak, u bat.

Ba - las

Ba - las

Ba - las

Ba - las

dah-lah gam-at lah. Su

dah-lah gam-at lah. Su-

95

dah-lah gam-at- lah. Su dah-lah gam-at lah Su dah-lah gam-at lah

dah-lah gam-at- lah. Su dah-lah gam-at lah Su dah-lah gam-at lah

98

Han - tu, han - tu, bol - leh to - long bo - rak, bo - rak, bo - rak, bo - rak!

tr gliss ad lib. (↑ ↓) *tr sim**

tr gliss ad lib. (↑ ↓) *tr sim**