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Mediation of Musical Storytelling, Meaning and Emotions Through AI Music Creation Assistant Software

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Abstrakt

Musik og teknologi har haft en uløselig forbindelse gennem historien. I disse dage bliver denne forbindelse endnu stærkere på grund af stigende inkorporering af teknologi i musikfremstillingsprocesser. Kunstig intelligens er en af de nyeste og nye integrationer, der både er en fascinerende og problematisk teknologi. Fænomenerne musikalsk fortælling, mening og følelser ser ud til at være blandt de mest bekymrende at parre sammen med kunstig intelligens. Denne artikel undersøger den Postfenomenologiske formidling af musikalsk historiefortælling, mening og følelsesmæssig udtryk gennem hjælp til software til oprettelse af kunstig intelligens Orb Composer og Orb Producer Suite for bedre at forstå teknologien, dens fordele og ulemper og til sidst finde Tekno-Antropologisk løsninger af hvordan man integrerer sådan software med hensyn til oplevelser fra musikproducenter og lyttere. Otte hovedtyper af teknologiske medier opstår efter at have udført etnografiske undersøgelser af brugere og lyttere: (1) lyd og formidling af musikalsk historiefortælling, mening og følelser, (2) formidling af lytterens oplevelse, (3) musikideer og hjælp til kunstig intelligens, (4) intuitiv og regelbaseret kreativitet, (5) maskine som en kreativ partner, (6) kreativ beslutningstagning, (7) formidling af inspiration og (8) hermeneutik af anvendelse af musikalsk kunstig intelligens software.

Abstract

Music and technology have had an inextricable connection through history. These days this connection is getting even stronger due to the increasing incorporation of technology into the music-making processes. Artificial intelligence is one of the most recent and emerging integrations that is both a fascinating and problematic technology. The phenomena of musical storytelling, meaning and emotions appear to be among the most troubling to couple with artificial intelligence. This paper explores the Post-Phenomenological mediation of musical storytelling, meaning and emotional expression through artificial intelligence music creation assistance software Orb Composer and Orb Producer Suite to better understand the technology, its advantages and disadvantages, and finally, to find Techno-Anthropological solutions of how to integrate such software in terms of the experiences of music makers and listeners. Eight main types of technological mediations emerge after doing ethnographic studies of users and listeners: (1) sound and mediation of musical storytelling, meaning and emotions, (2) mediation of listener's experience, (3) musical ideas and assistance of artificial intelligence, (4) intuitive and

rule-based creativity, (5) machine as a creative partner, (6) creative decision making, (7) mediation of inspiration and (8) hermeneutics of usage of musical artificial intelligence software.

Keywords:

Artificial intelligence; musical storytelling; musical narrativity; meaning, emotions, creativity, Orb Composer; Orb Producer Suite; music technology, mediation; Post-Phenomenology; Techno-Anthropology.

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1. Introduction

1.1. Introduction to the Topic

1.1.1. The Current State of Music Technology, AI Integration Into it And the Problematics of This Process

During "Inquiry Project: Ethnographic Fieldwork" module of MSc in Techno-Anthropology (TANT9), me and my groupmate and research partner Atakan Kara did a project which aimed to investigate usage of a set of open-source artificial intelligence (AI) music creation tools, Magenta Studio by Google, and how they can be utilized for creative practices of musicians. In the process, it became apparent that AI is almost set to become increasingly integrated not only in many areas of people's lives in general, but also in music production software (Banytė and Kara 2019). One argument is that digital audio workstations (DAWs) which these days is a crucial tool when producing music for a large part of musicians and even without integration of AI, DAWs already provide with a vast variety of very advanced tools that from a philosophical standpoint can be seen as a stair-step towards integrating AI. These changes could have the power to transform not only music itself but also the listener's experience. This mediation of a wide variety of technological tools in the creative-production processes is most visible in pop music but also present to a varying but most often high degree in other types of recent (produced during the 21st century) contemporary modern music (Warner 2003; Dean ed. 2009). All these tools that are being included in the creative process in turn decide how the music will sound because of the design and the limitations it possesses (Warner 2003). Music technology keeps evolving, changing, and altering the way musicians tell musical stories and express meanings and emotions. Moreover, several other technologies possess many similarities with the artificial intelligence software that will be investigated in this Thesis. Examples of such similar technology are synthesizers, arpeggiators and samplers. Again, speaking from a philosophical and slightly speculative point of view, already existing and most accessible music production software and other music technologies in a metaphoric way turns a musician into a musical "cyborg". That is because all the tools available that can elevate or even create new musical abilities provide previously unknown methods of creating music and seeing musical elements in new ways (Dean ed. 2009). Furthermore, even if AI that can assist while creating music or even to create music basically on its own, may seem like something from a science fiction movie, today there already exist and are used a substantial number of different AI tools for creating music: experimental, freeware, open-source AI tools and also commercial

software. Some examples are previously mentioned AIVA, Flow Machines, Amper, Deep Artificial Composer, Shimon, Pop Gun AI, and others (Dahlitz 2020). This project revolves around Orb Composer and Orb Producer Suite by a French company Hexachords. More information about this software, why it was chosen and how it works will be explained in the Introduction to the Technology chapter of this Thesis.

However, both excitement and many questions arise after delving into the topic of artificial intelligence and music. First of all, what do these developments mean for creative practices of musicians? After doing a loose digital observation of the general topic in order to take a more in-depth look into the problematics of technology that I am about to investigate by merely looking for articles, YouTube clips, forums and other non or less scientific sources where all kinds of people can share their points of view and feelings about AI-driven music creation software, several patterns of opinions and feelings seem to appear. Patterns of comments that appear in various platforms where users can leave their opinion, such as YouTube or music technology forums are the following (the order in which these are writing is random and not related to frequency or relevance): being excited about the possibilities and advancement of technology; expressing that they do not know how to feel about the software being able to do so much that a human composer can; feeling that it is too expensive or overpriced; saying that these tools are useful. Moreover, it is interesting to see that such software as Orb Composer and Orb Producer has quite many reviews made by YouTubers. It is being reviewed on many music production themed YouTube channels sometimes in a manner where it is shown in a very usual way and presented as another typical music production tool. At the same time, there are many videos discussing if such software is a good or a bad thing and very often a question of whether such tools are the end of human musicians is being raised.

1.1.2. AI Technology and Musical Storytelling, Meaning and Emotions

One of the most difficult questions to answer is whether AI can be useful for making music that can be described as “meaningful”: one that tells a unique story, evokes emotions, and has a meaning. Even though factually speaking, AI can create music, at the same time, it is often described as empty and without substance. Can it be assumed that AI cannot create music that has a meaningful story beyond the theoretical and technical aspects of a musical piece or is that only a subjective opinion? There are sources to support both of the clashing perspectives. During the TANT9 project, when we interviewed a researcher from Technical

University of Denmark (ITU) Marco Scirea who did his Ph.D. on AI-generated music for computer games, he explained that the main challenge for AI is telling a story. In other words, he again repeated that even though AI can create music, it seems to lack something meaningful, emotional - something that is very hard to put into a definition. This particular observation sparked curiosity and inspired me to look further into these obscure elements of music creation – storytelling, meaning and emotional content and how they mediate through artificial intelligence-driven music creation assistance software. When the primary goal of AI for music production processes is to assist and improve the creative process for musicians, the fact whether it can create something meaningful may seem mundane at first, since it is not the goal of this AI to produce music on its own. However, if we look deeper, similar problems and questions are still present even when artificial intelligence software only plays a complementary role. Does the AI software actually help musicians tell a story, and create music, does it make music less musically valuable and mechanical or is it just simply a different way of creating which has its pluses and minuses? These are only a few questions that arise when talking about incorporation of AI into the musical storytelling process.

This Thesis seeks to investigate the relationship between artificial intelligence and musical storytelling, meaning, and emotions. But what exactly is musical storytelling, meaning, and emotions? Musical storytelling is often defined as depiction of ideas, emotions, and other phenomena solely through musical forms. It is a concept that is slightly hard to grasp because it may seem that a more conventional form to tell a story is to tell it through written form. The topic of storytelling in music has many complex and debatable things in itself. One of them, as in many things related to art and creativity, is its subjectivity. Because of this reason (subjectivity), the Thesis takes an approach of letting the participants of the research project define the main concepts of this project (musical storytelling, meaning, and emotions) themselves instead of me trying to find and provide one "correct" definition.

1.2. History of Musical Narrativity in Western Instrumental Music

Before starting to analyze the investigated technology and problematics related to musical storytelling, meaning and emotional expression in present context, it is crucial to look at the historical developments of the phenomenon. From the point of view of Hans Jonas and also Post-Phenomenology which is the core theoretical standpoint of this Thesis, every technology has legacy which comes with meanings and workings (Botin 2015). Each technology is related

to one another because all technology has histories behind them and there can be found reasoning as to why one technology was developed into another (for example, a phone into a telegraph). Furthermore, again looking from Post-Phenomenological perspective, human activities and technologies cannot be seen as activities that are isolated from one another – they co-constitute themselves (Botin 2015). Musical storytelling throughout history was influenced by many factors and was also directly related to the existing technologies. This section, thus, aims to explain the development of musical narrativity (which within itself also carries the phenomena of emotions and meaning) in Western instrumental music and what important points concerning this Thesis they present. It is important to stress that this Thesis focuses on instrumental music because musical storytelling, meaning and emotions become significantly different in the context of, for example, songs and other vocal music.

I will start this review of musical narrativity throughout history by talking about ancient music and two contrasting music ideals that were dominant during the time – *math* or *rule-based* musical understanding *versus shamanistic* music understanding. From this I will continue the illustration process talking through the historical prism of development of different music types. Different music styles bring different understandings of musical discourse. They also have varied perceptions, expressions, and understandings of musical storytelling, meaning and emotions. In those sections, I will go through a few relevant types of music and technologies closely related to them throughout history to illustrate how the phenomena of musical storytelling have changed over time.

1.2.1. Roots of Rule and Math-Based Understanding of Music and What It Means For Current Understanding of Musical Storytelling

Roles and, in turn, narratives that music brings along in early human history were strongly related to rituals, communication and forms of meditation and was largely used as a means for survival (Fuentes 2017; Gioia 2019). Through history, music started having more complex and varied usages and meanings. Even though music is a form of art, at the same time, it is strongly tied and related to mathematics, logic, and rules. Most Western instrumental music is based on this and that was also evident when talking to our informants during the TAN9 project. For example, one of the informants incorporated *rule-based* methods in his creative process as made up dogmas that would help him create (Banytė and Kara 2019). The *rule-based* understanding nowadays has become more or less a norm. If looking at music theory

and rules as a technology, they (music theory and rules) are powerful factors of how musical stories and, in turn, meanings and emotions are mediated through music. However, *rule-based* music understanding has controversial history and other types of understandings and communications of music existed and still exist both in Western and non-Western music. Some scholars argue that this understanding became so dominant because of political and other influences and not because of "natural causes". Even though also discussed in Chinese and Indian philosophy, the roots of the *math* and *logic-based* musical understanding in Western music comes from ancient Greece, and especially philosophers Plato and Pythagoras (Gioia 2019). Tempered tuning system that is widely used in most of today's Western music comes from Pythagorean ideas about mathematical ratios and universal laws. In addition to this, in the Book VII of *The Republic,* Plato acknowledges that music has power to affect human emotions and reasoning. Thus he states that regime music must be tightly regulated. This notion expressed by Plato influenced music in a way that prevented certain music which was more *shamanistic* and not as *rule-based* from being popular. According to an American jazz critic and music historicist Ted Gioia, a similar political pattern that refused more *shamanistic* or *magical* music and praised *rule-based* music has been repeated throughout history and has made *rule-based* music much more popular than it hypothetically could have been (Gioia 2019). The same negative and avoidant stance, according to him, was also present among music historians and other scholars who avoided any evidence of the existence of *shamanistic* or *magical* elements, definitions and understandings in music (Gioia 2019).

1.2.2. Musical Storytelling, Meaning and Emotions in Western Classical Music

Western classical music is defined as more serious music that is not created to be popular or commercial but also not as lowbrow and everyday music as folk and vernacular music in general. The rule-based approach of creating music largely influences Western classical music. The larger part of classical music is based on very strict harmony and other rules, is written out on music sheets as precisely as possible and should be able to be read and played by other musicians. Classical music can even be seen as having a certain archaic, focused on traditions and strict mindset when composing music, thus telling musical stories (Goodall 2013). This mindset can still be felt in music education institutions. It is as if only certain types of stories can see the light of day. In terms of instruments, in classical music, there are usually used a set of "traditional" instruments and also particular ways of tuning these instruments and making instrumentations based on rules. Even though instrumental classical music is considered very

abstract, some composers are often regarded as creating more storytelling, expressive and emotional instrumental music. Even though it is challenging to find these reasons and to put them into words, some of these composers are Handel, Beethoven, Wagner, Russian romanticists (Stravinsky, Scriabin, Prokofiev, Shostakovich) and French impressionists (Debussy, Ravel).

However, starting the 20th-century classical music started also having many experimental elements, and especially during the 20th century when composers started to seek to bring in something new into the classical music scene which, according to them, appeared to have discovered everything that exists in music. Those composers would break all kinds of established rules and systems in classical music or make extremely different performative choices. Some examples are atonal music, different music notation systems, using everyday objects as musical instruments and so on. However, most of these experiments did not become widespread norms or become very popular.

To finish this section, I would like to go back to Beethoven. It is interesting that Beethoven's music is both considered very storytelling and emotional and at the same time recently there has been AI developed in order to finish his famous Unfinished Symphony (Symphony No. 10) and to perform it by a live orchestra this April (2020) in Beethoven's home town (Houser 2019; Fulker 2019). Up until this day, AI, hypothetically because of its mathematical nature, has shown very impressive capabilities in reproducing or producing classical music. A thought-provoking and controversial discussion can be raised here in terms of storytelling, meaning and emotions, which seem to have a potential to break notions that computers cannot produce emotional music.

1.2.3. Musical Storytelling, Meaning and Emotions in Jazz

Jazz music brings other relevant and thought-provoking ideas into the topic of this The-sis. *Jazz* started emerging as early as the very end of the 19th century and it is impossible to retrace the precise birthplace and time of the genre. However, New Orleans in 1920's is most often called the birthplace and time of *jazz* music and there is a good reason for that. New Orleans was a melting pot for various (mostly African American) musicians and genres of music c*lassical music, blues, ragtime, church musi*c and other music traditions created distinc-tive *jazz* genre and helped it to become popular (Cohen 2015).

When talking about technologies that mediate *jazz* music, most commonly, this genre had and still has these days, quite a set in stone variety (of course, there are exceptions) of musical instruments used in the genre. These instruments most commonly are an acoustic drum-set, electric bass guitar or a contrabass, electric guitars (most often clean or semi-clean toned), piano or keyboards and a saxophone. *Jazz* music also has a very distinctive harmony and rhythmic structure.

As previously mentioned, *jazz* music differs from other contemporary musical genres. For this reason, it provides interesting points to view in the Thesis topic. One of the most prominent features of this music is the element of improvisation and the importance of being in the present moment and expressing raw emotions. Famous *jazz* musician Herbie Hancock in his MasterClass, also explains *jazz* as the highest form of musical creativity because *jazz* musicians improvise and create musical stories in the moment. He also emphasizes the importance of emotional content, "soul" of music and musicality (MasterClass 2017). Even though based on *jazz* harmony and other music rules, the improvisation element of *jazz* music focuses on the creative-intuitive momentum rather than building music in a block like manner where one has so much more time to think about and construct one's ideas. This can be contrasted to the com-position and performance of classical music.

In addition to the previously mentioned ideas, there are more reasons for picking *jazz* as an example. It is compelling and important to mention the *jazz* genre because storytelling as a definition and a phenomenon has relatively high prevalence and even a special place in the glossary of *jazz* musicians. This definition is used a lot among jazz musicians and listeners (Bjerstedt 2015). A study by Bjerstedt (2015) on *jazz* musicians' understanding of storytelling in *jazz* sees the definition as metaphorical rather than literal. Storytelling in *jazz* is often viewed as communication, expression, mission, or vision. One of the most thought-provoking things when talking about *jazz* and musical storytelling is whether it is a noun or a verb. Some (most notably - Small) argue that *jazz* storytelling is all about being in action and that action is storytelling, there is no actual end product. According to Small, *jazz* should be understood as an artistic practice (Bjerstedt 2015). This, in some studies, appears to be an ontological and cultural contrast:

„The noun/verb distinction may be seen as the linguistic manifestation of a profound dichotomy which, according to Small (1998), is both ontological and cultural: 'The European tends to think of music primarily in terms of entities, which are composed by one person and

performed to listeners by another... The African musician, on the other hand, thinks of music primarily as action, as process, in which all are able to participate' (45)." (Bjerstedt 2015).

Moreover, Bjerstedt (2015) conducted a study of *jazz* musicians' understandings of *jazz* storytelling. Main ideas from the study are the following: authenticity is crucial; improvisation is binding contextually (performance with other musicians and also audience); audience may understand a performance (a piece) differently – many musicians themselves see it as something for audience to interpret and do not seek to tell a specific story during performance. Yet, some informants also say that *jazz* improvisation barely could exist without trying to tell a story; music is more expressive than language; music is a world of its own; and finally, sociocultural situatedness is vital in understanding the story behind music.

Of course, elements always come down through a spectrum and no hard line should be drawn. To bring back the discussion to the topic of AI and musical storytelling, there are existing ways for utilizing both algorithms and AI to improvise with music (for example, live coding). One of the key elements both in the musical creative process in general and in improvisation is listening. The way a human and AI listens and understands music differs. Current scientific understanding explains that these creative approaches have its strong and weak points. As it is apparent that in *jazz* music, there is a high importance of musical momentum, many questions still arise. For example, could the concept be translated when using AI software and does it need to be translated in the first place? How does the intuitive approach influence creative product and creative process? Does it relate to the end product being soulless? Or is the issue more complex?

1.2.4. Musical Storytelling, Meaning and Emotions in Modern Popular and Electronic Music

As mentioned previously, modern music is heavily mediated with a very broad spectrum of technologies and, in addition, influences (stylistic, cultural, economic, political, *et cetera*) in general. Probably the most influential and widely used technologies in today's music making-storytelling processes are synthesizers, MIDI technology and VST technology, of course, mixed with older musical inventions such as traditional musical instruments. Essentially, an element of variety is highly present in today's popular music. For example, popular music genres are blended. This makes musical stories more multifold than ever.

In addition to this, modern popular and *electronic music* is not as *rule-based*. Even popular music is relatively experimental and "free". In terms of musical forms, *electronic music* is often based on a song form. However, time and time again, there is no following of any specific musical forms and the creators of such music do not even have intentions to follow any rigid rules. In contrast, such creators even avoid following any rules. This is especially prevalent in experimental and alternative styles of *electronic and indie music*. In addition to the often-used song form, an essential and distinct element in a large part of *electronic music* is something called a *drop* or a *beat drop*. *Electronic music* frequently is abstract, minimalistic and can be described as meditative. It is often the case that modern music creators do not have (of course not as a rule) formal music education and (or) do not know how to read sheet music, which, to come back to *classical music*, would make it nearly impossible to make music with-out possessing such skills. One reason behind this is the fact that modern music creation soft-ware can provide one with visual and simplified music representation and makes the need of reading sheet music or knowing music theory almost mundane. Thus, the musical storytelling process itself often is more intuitive.

1.3. Scientific Understandings of Musical Storytelling

Statements that "music tells a story" followed by in some way related "music expresses emotions" and "every musical piece has meaning" are commonly heard these days. Yet when the person that uses such phrases is asked to explain what does he or she mean exactly, feedback one gets quite often is either a puzzled look or a realization that the more people you ask, the bigger variety of answers you get. Furthermore, it does not seem that these answers would be the same if asked fifty or hundred years ago. As previously discussed in the Thesis, this subjectivity of the matter is both fascinating and frustrating. Thus, it is not surprising that through scientific history, this topic has caught the attention of many different scholars. There are a vast amount of studies studying musical narrativity, meaning and emotional expression and their studies are spread around different yet at the same time often interconnected scientific fields. Disciples studying musical narrativity include but are not limited to musicology, narrativity, semiotics, rhetoric, philosophy, psychology and anthropology. Besides, not only theories and ways to understand the phenomena have developed and changed over time, but also the variety and usage of tools for creating music has changed a lot. This means that musical storytelling as a phenomenon is very much related to the existing technology at hand and at the same

time, together with so many other factors. This section of the Thesis aims to provide an overview of currently relevant scientific understandings of musical narrativity, meaning and emotions, in order to later ground it and relate it to my own Techno-Anthropological study of the topic which stands as an anthropological perspective.

1.3.1. Parallels Between Music and Language

A starting point in many scientific studies of musical narrativity is its comparison to language. Even if music and text have different purposes, at the same time, lots of parallels can be drawn. Similarities and differences between the two were discussed in many debates of linguistics, musicology, psychology, and philosophy. It can also be viewed through glasses of rhetorics, which developed in language and philosophy and later was adopted in music (Saint-Dizier 2014). According to Saint-Dizier (2014), the purpose of language is to convey meaning and, in turn, can provoke affects. Music also conveys meaning but not in the same way as language. Music is designed to convey affects. However, these affects are not only psychological; they can also have meaning. Besides, music is also often considered more universal than language. Even though (at least when speaking about Western music) there are, of course, differences of understandings of the same music piece when looking at people from different cultures, it is a lot easier to understand music from a Western foreign country than a foreign language. However, at the same time, it is essential not to forget that many ethnomusicologists would disagree with the idea of music being universal (Gioia 2019).

1.3.2. Point of View of Musicology and Semantics

Roles and, in turn, narratives that music brings along in early human history were strongly related to rituals, communication and forms of meditation and was largely used as means for survival (Gioia 2019). During history, music started having more complex and varied usages and meanings. It is hard to tell at which point more clear narrative like features in music started to be visible as the actual existence of narrative is often problematic and up for debate. However, the development of musical forms plays a significant role on how musical storytelling has changed throughout history. Musical form is a skeleton (basis) of a musical piece and, in turn, dictates when, how and what musical elements should be placed in a creation. In other words, musical form is the basis for building musical narrative. Various musical

forms or detachment from them (for example, in some of the current instrumental *electronic music*) were and are prominent during different points in history. The Classicism period is an important taking off point when talking about narrativity in music because it brought dramatic structures to music and the *sonata form* (Pawlowska, ed. Zatkalik et al. 2013). The *sonata form* can be related to theories of music as a narrative. Karol Berger writes that not every musical form is as relevant for narrative:

"Only some types of musical forms (the model form being the classical sonata form) use fully the fact that music, happening in time, organizes the succession of the work's phases and the causal logic of mutual relations between the phases, which is of great importance [for narrative: MP]" (Pawlowska, ed. Zatkalik et al. 2013).

Pawlowska (2013) analyses Tchaikovsky's "Romeo and Juliet" - an instrumental symphonic poem composed using *sonata form* and based on Shakespeare's "Romeo and Juliet".

1.3.3. Narrativity

One of the most significant scientific perspectives of looking into music's means of expressing a story is narratology. Narratology was developed in the 1960s and, at the time, was a literary theory. Later it started to develop into having an inter- and transdisciplinary perspective. The debate of music having a narrative started to spark in the 1970s and in the 1980s when there was a so-called "narrative turn," which resulted in perceiving narrative as "a primary act of the mind, transferred from life to art and all human artifacts". This, in turn, increased thoughts and ideas of music having a narrative even more. These days the field of narrativity is very dynamic and inter-, transdisciplinary. Tools that originated from literary theory are even used to study music history while studying musical forms and genres. (Pawlowska, ed. Zatkalik 2013). One of the leading narratologists is Algirdas J. Greimas. He developed the *semiotic square,* also known as *Greimas square*:

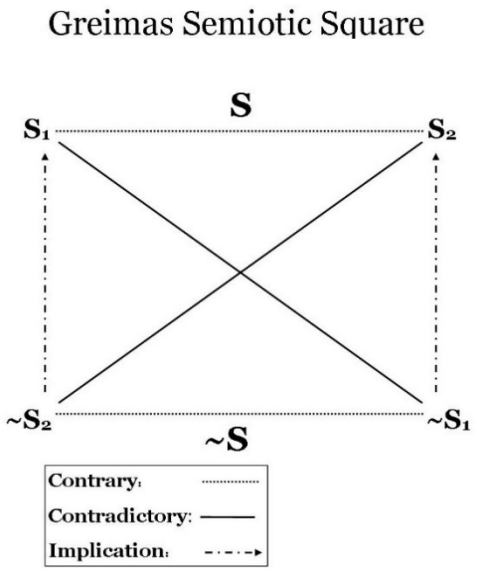


Figure 1: *Greimas semiotic square.* Source: *Zatkalik, Miloš, Milena Medić, and Denis Collins. Histories and Narratives of Music Analysis, 2013. http://site.ebrary.com/id/10828298.*

It aims to understand semiotic elements through opposition of concepts – for example, love and hate, happiness, and sadness and so on (Pawlowska, ed. Zatkalik 2013). These semantic oppositions help to open up for a more in-depth analysis of, for example, a music piece, a myth and so on. Pawlowska analyzes Tchaikovsky's "Romeo and Juliet" and narrativity of this piece in relation to this square. Prominent oppositions in "Romeo and Juliet" are *peace versus war* and *love versus hatred* (Pawlowska, ed. Zatkalik 2013).

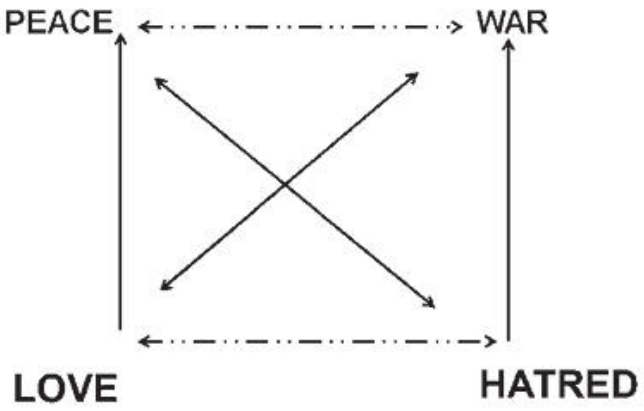


Figure 2: *Greimas semiotic square in relation to Tchaikovsky's "Romeo and Juliet".* Source: *Zatkalik, Miloš, Milena Medić, and Denis Collins. Histories and Narratives of Music Analysis, 2013. http://site.ebrary.com/id/10828298.*

1.3.4. Musical Storytelling, Meaning and Emotions in Music Therapy

Psychology can offer many studies on creativity, which is directly related to musical storytelling, meaning and emotions. Concerning this project, it is relevant to talk about a specific branch of both ongoing practice and a research field – music therapy. Music therapy is a well-established method among other therapeutic methods and is used (sometimes on its own, and sometimes in combination with other therapeutic practices) to treat or (and) improve various psychological and psychiatric conditions such as anxiety, depression, autism and others. The basis and goal of this treatment most often is to eliminate negative mood states and to diminish negative psychological states that, in turn, leads to negative behaviors. Music therapy aims to help a person adapt positive and healthy behaviors, which leads to wellbeing, improved mood and happiness (Thaut, ed. Juslin 2011). All this proves that there is a large body of evidence that music can affect emotions and change behaviors. Moreover, this again improves understanding the phenomena of emotional effectiveness in music that was created with the assistance of AI software. To add to this, music therapy also can help to see emotions and experiences that can be difficult to express otherwise due to traumas and other factors that make negative emotions and are otherwise hard to communicate, and sometimes even in cases where there it is difficult to communicate using language anyways especially with children (Thaut, ed. Juslin 2011). Finally, Gioia calls music therapy a *shamanistic* music practice (Gioia 2019). Again, all this means that musical storytelling, in this case, can be used to directly affect psychological states, as is not used in a more abstract way as in the arts but in a more pragmatic way. What is more interesting is that there are already attempts to incorporate AI into these processes. For example, AI can be used to generate music in accordance with the person's heartbeat.

1.4. Listener's Perspective

Even when looking through a historical prism, creators and listeners can be seen as two separate entities. Musicians did not pay so much attention to the audience and it did not dictate the creative outcome as much or would not need to dictate (Gioia 2019). Today, in most cases, the creator and the listener is very much connected. This especially matters for the topic and problematics of the topic of musical storytelling, meaning and emotions investigated in this Thesis. Even the phrase storytelling has "telling" in it. What I mean by this is that to tell a story, one needs to tell it to someone. And most of the time, the subject of this action is not

themselves. This makes it very important when talking about music created with the help of AI to talk about it not only from a musician's-creator's perspective but also from the receivers'. What is most important to find out is whether music created using AI does not lose the emotional and meaningful value and how does this music mediate with the listeners. After all, the phrase that music created by AI does not tell a story comes mostly from a listener's perspective.

1.5. Introduction to the Technology

After introducing the topic and its historical and scientific perspectives, this section will aim to get familiar with the investigated technology, which is Orb Composer (1) and Orb Producer Suite (2) (**Figures 3 and 4**). This includes the reasons for choosing this particular software, its interface, inner technical workings and also discussion on the problematics related to Orb Composer and Orb Producer Suite.

1.5.1. Choice of the Investigated Technology

As mentioned earlier, during "Inquiry Project: Ethnographic Fieldwork" module, I together with my groupmate, investigated another AI music creation assistant – open-source software Magenta Studio by Google. This software has many similarities and meeting points with the current main investigated technologies Orb Composer and Orb Producer Suite by Hexachords. Main similarities are its interface, functions and, most importantly, the fact that it is designed to assist the music creator. There are other types of AI, for example, some of them are designed to generate music, in essence, on their own. One example of such musical artificial intelligence software is AIVA (Dahlitz 2020). However, I am simply most curious about investigating AI software that acts as an assistant. Yet, one of the main issues with the previously investigated software Magenta Studio, according to the empirical data collected, was its simplicity (Banytė and Kara 2019). This led to trying to find out if more sophisticated and capable software exists. As Magenta Studio is open-source software, one of the first instincts was to investigate commercial software. Not because I am seeking to compare open-source and commercial software but because if someone is willing to pay large amounts of money for a computer program, as most software for music production is expensive. Orb Composer and Orb Producer Suite are not exceptions. Thus, following that logic, they must be complex enough and maybe even more complex than Magenta Studio. However, this was only an initial

assumption after doing some research on Orb Composer and Orb Producer Suite and I wanted to put it to the test.

1.5.2. Introduction of Orb Composer (1) and Orb Producer Suite (2)

Orb Composer (1) (Figure 3) is an artificial intelligence music creation assistant software. The first version of it was launched in 2018 in France by a software company called Hexachords, which is led by its CEO Richard Portelli – an artificial intelligence engineer, physicist and an entrepreneur. According to the company, it was a result of extensive research that lasted for more than five years (Orb Composer 2020). It is a stand-alone application; however, integration of various plugins is available to some degree even though it requires some additional effort (Orb Composer 2020). There is also a simplified version of the Orb Composer software called Orb Composer Artist – but it will not be discussed in this Thesis.

Orb Producer Suite (2) (Figure 4) is another artificial intelligence assistant software by the same company. Orb Producer Suite stemmed from Orb Composer and it is very recent – it was introduced in the spring of 2020. It is highly similar to the Orb Composer software. Namely, it has a similar AI engine, functions and interface details. However, in contrast to its predecessor, Orb Producer is a set of plugins that can be integrated into digital audio workstations. A very large part of music creators (with an exception of classical music composers, movie music composers and some others) use a digital audio workstation of their choice and incorporate third-party plugins into it. Besides, Orb Producer is aimed for (however, not as a rule) music producers rather than composers (in contrast to Orb Composer) (Orb Composer 2020).

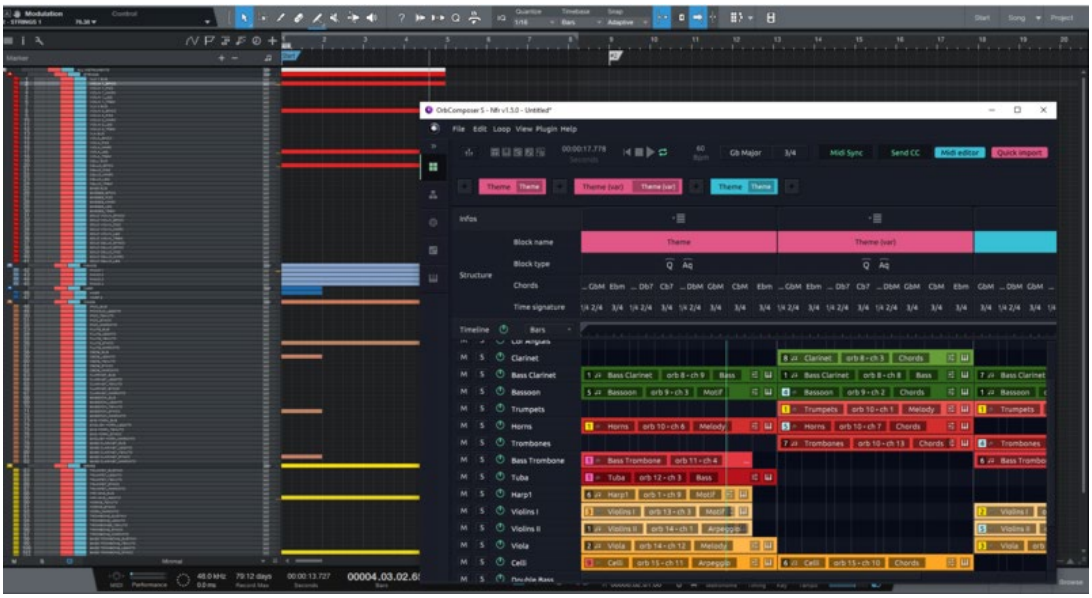


Figure 3: *Orb Composer (1) AI Music Creation Software.* Source: *https://www.plugin-boutique.com/products/6108-Orb-Composer-Pro-S-1-5*.

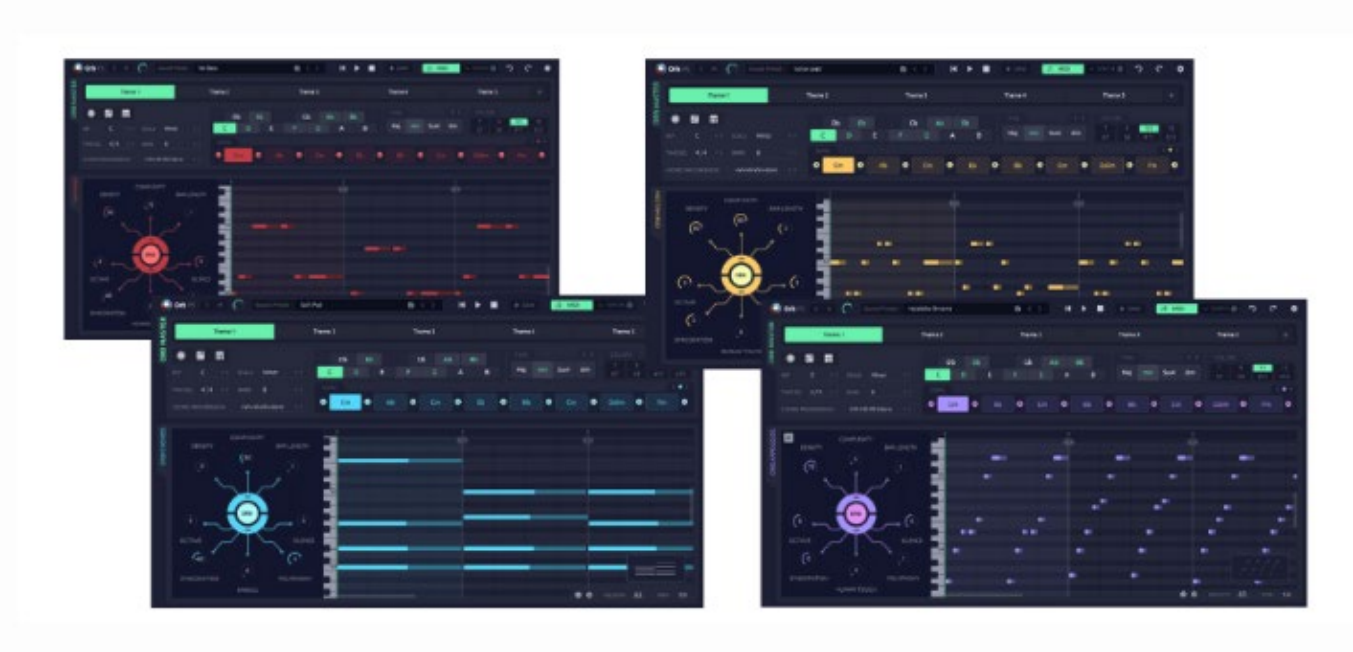


Figure 4: *Orb Producer Suite (2) AI Music Creation Software.* Source: *https://www.orb-composer.com.*

1.5.2. Interface, Functions and the Inner Workings of Orb Composer and Orb Producer Suite Software

As already mentioned, **Orb Composer (1)** software is a stand-alone application. First of all, the software presents the user with templates of various genres to help speed up the

process of starting to create (according to the company). Custom templates can also be added. The layout in which the musician using this software has to work consists of something that is called *blocks*. That is elements of music that can be inserted in relation to your musical input. These *blocks* inside the software are divided into sections of music (introduction, different theme variations, ending of the piece and some others). These sections depend on the template that is chosen. On the top side of the program's interface, there are several artificial intelligence generation tools and also tools for changing musical parameters, such as tempo, key signature, meter and *et cetera* (Orb Composer 2020).

Orb Producer Suite (2) is a set of 4 different musical artificial intelligence tools and an additional synthesizer: Orb Chords, Orb Melody, Orb Bass, Orb Arpeggios and Orb Synth. All the plugins are synced together. The creation process has to be started by launching the Orb Chords plugin because it coordinates all the others. Orb Chords tracks have to be inserted into the master track (an audio track that "coordinates" and encompasses all the individual other tracks in a DAW). After that, the user can add any of the other tracks into other individual tracks. On the top left side of each plugin, there is a set of musical parameters as in the Orb Composer – tempo, key signature, measure and so on. On the top part of the interface, there are also options for changing the chord progression from one the one provided at any point. Chord types and other chord qualities may also be selected. The user can switch from a synth and a MIDI view. MIDI view allows you to use your own software synthesizers to create music, synth mode, in contrast, utilizes the Orb Synth. In the MIDI view, there are two types of AI functions (**Figure 5**) ***parameters*** *(density, complexity and phrase length,* and ***modifiers*** (*octave, syncopation, spread, polyphony and silence*) (Orb Composer 2020).

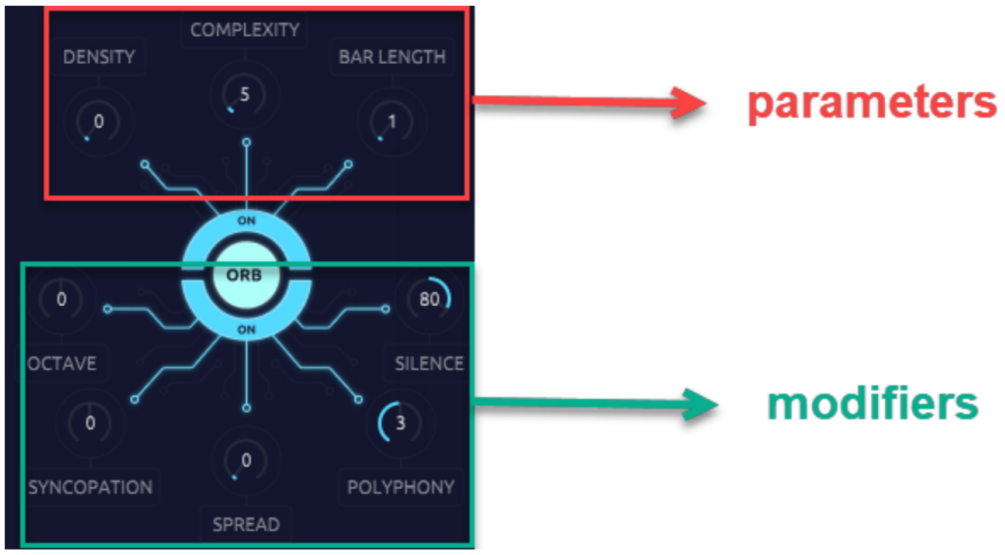


Figure 5: *Orb Producer Suite's AI functions.* Source: *https://orb-composer-wszhqtjkj7xhcykjvf.netdna-ssl.com/wp-content/uploads/2020/03/Orb_Producer_Suite_GettingStarted.pdf.*

Both Orb Composer and Orb Producer Suite utilize the same AI engine called Orb AI Engine. It is another limitation of commercial software in contrast to, for example, an open-source program is a fact that it is much harder to find information about the exact neural networks the software uses. That is precisely the reason why I could not find detailed information on that matter. However, it is the most likely scenario that both of the softwares use deep learning networks called Recurrent Neural Networks (RNN) together with Long Short-Term Memory (LSTM) because there are not many different types of artificial intelligence neural networks for music creation that exist. Furthermore, RNNs are the most advanced and have shown the best results to date (Arrais and Avila 2018). The core principle of the workings of RNN neural networks is attempting to guess the best possible outcome in relation to the dataset that has been fed into the AI. These networks, in addition to some others, are the same as the networks used in Magenta Studio (Arrais and Avila 2018; Magenta 2020).

1.6. Problem Formulation

All these previously talked about ideas and issues prove the importance of investigating the topic of the integration of AI software into musical storytelling, meaning and emotional expression processes. Furthermore, those ideas and issues lead to the following problem formulation, which this Thesis aims to answer:

"How does musical storytelling, meaning and emotions mediate through artificial intelligence music creation assistant software?"

In addition, there also were three sub-questions raised to help to answer the main problem question:

- *"What are the ways artificial intelligence music creation assistant software engage with musical storytelling, meaning and emotions?"*
- *"How do a musician's capabilities of musical storytelling and emotional expression mediate through the usage of artificial intelligence music creation assistant software and how do the listeners perceive the results?"*
- *"Why integrate artificial intelligence music creation assistant software into creative processes of today's music creators in terms of storytelling, meaning and emotional expression and what impact such integration has to the listeners?"*

2. Methodology

To answer the problem formulation, literature research and empirical data collection were performed. This section will review, describe and explain these two methodologies.

2.1. Literature Research

For the process of literature review, three main topics had to be researched in relation to the problematics of this Thesis: artificial intelligence and its integration into the music-making process, historical and theoretical knowledge on musical storytelling, meaning and emotions and, finally, learning about Post-Phenomenology. None of these topics are an uncharted theory, but at the same time, there are many questions still not answered and there seems to be

a lack of focus on storytelling, meaning or emotions concerning artificial technology. This Thesis will add to the existing literature by adding the Techno-Anthropological perspective in relation to the Thesis topic.

Main keywords used in the literature research process were the following:

- Keywords: *artificial intelligence, musical storytelling, musical narrative, musical semiotics, meaning, emotions, creativity.*
- Specific keywords and phrases for literature research: *musical narrative history, history of musical narrativity, musical narrativity theory, semiotics of music, music and semiotics, history of musical semiotics, music therapy, music and emotions, affective musical intelligence.*

2.2. Design of the Empirical Research

In addition to researching and reading scientific literature, the process of producing this Thesis also includes collection of empirical data. The empirical datasets used in this Thesis were: (1) an experiment with Orb Composer and Orb Producer software, (2) an experiment with listeners and (3) some data from the TANT9 project. In this chapter, there will be explained the design and reasonings of the empirical data collection processes.

2.2.1. Practical Problems When Investigating the Chosen Software

The decision to investigate potentially more sophisticated software that is designed to be used for assistance in the creative musical process, and in this particular case, as previously mentioned in the Technical Understanding part of this Thesis, it happened to be commercial software. This choice caused a few practical and other problems which had to be solved. Some of the problems or obstacles could not be solved but they will be explained in this part - their impact to the findings of the final Thesis and how potential drawbacks were prevented by being aware of those restraints.

Investigating commercial software raises problems related to accessibility. Most of the software that is available for music production is expensive, and, in addition to that, AI music creation software is also considered niche software. Thus, first of all, this made it hard to find

people that were already using it. Secondly, because of the price tag, only trial versions of both Orb Composer and Orb Producer Suite software were used for the first of the two experiments that were conducted during the empirical data collection process. The trial versions each has its limitations, which of course, prevented more extensive investigation. However, the trial versions proved to be enough for the scope of this project and in terms of how much time could be spent on collecting the data because of the need to meet the delivery deadline of this Thesis. In addition to this, the data, apart from the input provided by the research participants, were complemented with performative auto-ethnography, observations of the internet and an interview with a musician who was already using the software for a while.

Trial versions of the software had specific limitations. Orb Producer Suite had the limitation of being able to try the software only for four days but without any other constrains. Orb Composer did not have time constraints and the user could utilize all the features but one could only produce what is called "one block" of music, the program would shut down after one hour of using it and the user would need to restart it to be able to compose again; finally, the results could not be exported. All in all, using the trial versions was a limitation that could only give a glimpse of the usage. There is a possibility that the experiences might have been different after using the software for a longer time. However, this does not mean that the results are not relevant at all as they still give important insights and show what is essential to pay attention to, especially when doing further and more extensive research in the future.

2.2.2. Getting to Know the Field

The first month of the Thesis project was dedicated to getting to know and finding the field. The process included gaining general understanding, figuring out where to look for informants, what kind of methods could be needed in order to collect relevant data, mapping issues and controversies both from creators and listeners and *et cetera*. The process of gathering initial opinions and understandings included a variety of sources, including internet platforms, where groups of people and users in general or potential users of AI musical technology express their points of view. Some examples of those kind of sources were YouTube, Facebook, Discord, internet forums and articles on popular websites. This helped to see if the opinions, understandings, experiences, and public opinions, expressed in those sources differ or are similar to strictly scientific sources. Also, to find out what are the important problematics, potential positive sides, and problems with the software. Finally, this initial "getting to know the field"

phase laid the foundation for problem formulation and, in turn, questions asked of the informants.

Initially, this part of the process was planned to include more "real life" interactions in addition to digital spaces but COVID-19 got in the way. For example, potentially going to festivals, events, and similar spaces to talk to people, interact with them or make observations as that kind of strategy worked well during the TAN9 project. This might have opened up for new contacts and potential research participants as well, which now were mainly found by making posts in Facebook groups. That is not necessarily a flaw but the interactions with people happen differently (chatting with people in a festival versus posting a text with specific information to a Facebook group) and might affect the data collected. For example, when one writes a post asking for people who would be interested, there is quite a high chance of finding people who have a positive bias towards the research topic or technology.

2.2.3. Auto-ethnography

This initial stage also included doing autoethnography. My previous academic background before studying MSc in Techno-Anthropology is a Music Production B.A. degree in Music Technology and Industry, together with a minor degree in Philosophy. Thus, having not only academic and practical knowledge and personal experience working with somewhat similar software, made it feasible to do autoethnography fairly quickly. That is not to say that not having this kind of knowledge would have prevented one from the possibility of doing autoethnography. However, my previous background and experience is an important detail to mention, as my being a "native" has both advantages and potential disadvantages. Prior knowledge and experience make it easier to navigate the field and to find participants. However, when being in the field, certain biases may appear - for example, it is more difficult to stay neutral and not to get stuck in your own head and ideas. Which is one of the reasons for not having a focus on an ethical side of AI and making this study as neutral as possible. Ethical dimensions could become more visible after doing analysis, but that can happen as an outcome and not "a goal." Autoethnography helps to foresee potential issues that could happen when users try the software themselves as my background and experience with software might be similar. The type of auto-ethnography that was performed during the Thesis project was *performative*. Finally, it helps to form further questions for interview guides. Besides, it aids getting some insights as to questions to ask from informants in the future as well to collect additional empirical data.

2.2.4. Experiment No. 1: Orb Composer and Orb Producer Suite

The first central part of the empirical data collection was the experiment with Orb Composer and Orb Composer Producer Suite software, which lasted about two weeks. Before this experiment, in addition where was also conducted about an hour-long semi-structured interview from one musician Oscar (the name was changed for privacy reasons) who has already been using Orb Composer software from time to time for a while.

During the two week experiment, the two musicians Lars Wellejus and Mikkel Rasmussen, with no previous experience with either of the two softwares, were asked to experiment-tinker with both of the programs. As already mentioned in the Introduction to the Technology part of this Thesis, they both use a very similar AI engine but the interface among some other things are different. The experiment went in the following manner: first, there was conducted an initial, about 30-60 minute long interview to get to know each of the informants, to learn more about their usual creative process and to answer any questions that may arise about the process of the experiment itself. Then each person would be given about a week to experiment with the Orb Producer Suite and, if possible, to try to produce a short musical piece using the software. After the informants finished experimenting, another interview was conducted with each of them to talk about their experiences using the software. During the second week, the same process was repeated with the second piece of software - Orb Composer.

The goal of this experiment was not to assess the technical capabilities of the software or to do a usability assessment but to see from a broader perspective how does AI software incorporation as an assisting tool mediate in musical storytelling, meaning forming and emotional expression processes of the informants. All of the interviews conducted during the first stage of the experiment in terms of questions asked can be loosely divided into two main sections. **(1)** First series were about getting to know the informants and finding out about their current musical storytelling process and experiences. Both because of the nature of the research topic and the anthropological nature of this Thesis, it was essential to focus on the lived experiences of individuals and not so much on conducting a quantitative study. The getting to know process also included listening to their musical pieces and "reflectional mini analyses". This was also done to better see informants as unique individuals and to understand their unique creative approaches better, because as it was observed during the TAN9 project, creative approaches of musicians might vary quite considerably. However, some quantitative elements, of

course, still exist to a degree, which was needed to produce further Techno-Anthropological recommendations and to decide what are the most relevant points found in the empirical data collected. **(2)** The second part of the questions was about finding out how the incorporation of the Orb software mediates current creative musical storytelling processes of the informants and what are their lived experiences using the software. Here is an example of one of the interview guides used for a semi-structured interview:

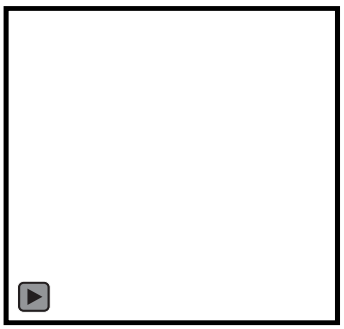
Interview Guide 3: After Trying To Use Orb Producer Suite and Orb Composer	
Introduction	
Musical Storytelling Process	• Can you describe how you used the software? • What story, meaning or (and) emotions (if any) were you trying to express through your process? And how did this process relate to the AI technology used? • Can this software be used for musical storytelling, meaning or emotional expression? • Does the software enhance your capabilities or assist you in any way? • Were you able to produce a small musical piece? If yes, can you share your experiences?
User Interface in Relation to Musical Storytelling Process	• Did the software inspire you? • What emotions did you feel when using the software? • Did the software meet your expectations? • Is the software in any way similar or different from the software, you are or were already using?
Perspectives For the Future Development	• What would you improve in the software so it would better suit your musical storytelling needs?
Outro	

2.2.5. Experiment No. 2: Listener's Perspective

As already discussed before, musical storytelling is not only about expressing and communicating ideas, stories, meanings, and emotions of musicians but also highly depends on listeners and their perception. In other words, usually, when a musician attempts telling a musical story, it is almost implied that it has to have a recipient. That is why the process, goals and content of a musical story might highly depend on thinking about the potential listener. In addition to that, many critique points and controversies related to AI usage in music and emotions, meaning and expressiveness are related to the listener's perception and opinion. Because of the reasons mentioned, a glimpse into the listener's understanding was also included as empirical data.

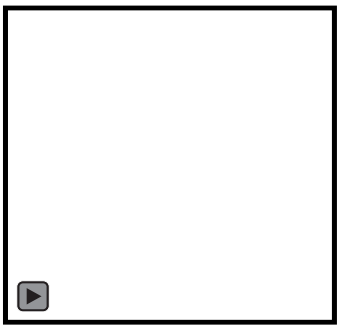
During the second experiment, there were conducted listening sessions-short semi-structured interviews with 4 participants: Jasmina Al-Mousawi, René Michal Cehlrál, Kat and Sofia (the name was changed due to privacy reasons). During the time of the experiment, the COVID-19 situation has improved and two of the interviews were held face to face (with Jasmina and René). This allowed for better communication and emotional perception of the informant's experiences. The remaining interviews were conducted using online video and audio communication platform Zoom.

The informants listened to 4 relatively short music excerpts – two created with the assistance of AI software and two without such assistance. The audio during the experiment was played in the same order as listed in this section of the Thesis. I will now list these excerpts; audio files of this music are numbered in order and are included further below this paragraph – audio files are attached to this PDF file and should be possible to play by pressing on the icons. If, for some reason, the files cannot be played, the same files in the same order are also attached as an appendix. **(1)** First excerpt piece was a piece created by one of the informants Lars without the assistance of AI:



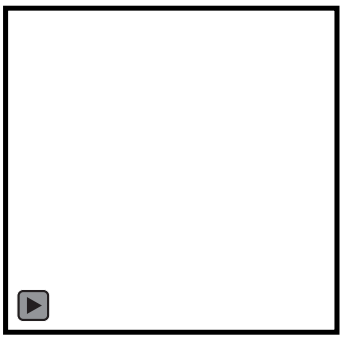
Audio excerpt 1: *Music piece by Lars Wellejus.* Source: *https://pixabay.com/vectors/sound-audio-music-icon-studio-2170379.*

(2) The second excerpt was a demo provided in the official YouTube social media channel of Orb Composer. It is a track created with the assistance of Orb Composer:



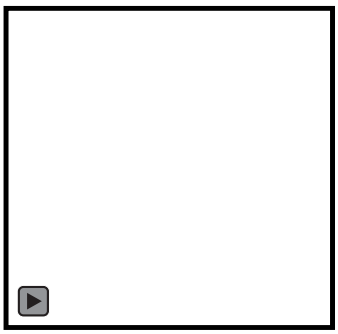
Audio excerpt 2: *Music piece by Benjamin Maisonet composed with the assistance of Orb Composer AI.*

(3) The third piece of audio that was provided to the participants of the listening experiment was a music track created by one of the participants of the first experiment for this Thesis – Mikkel with the assistance of Orb Producer Suite AI:



Audio excerpt 3: *Music piece by Mikkel Rasmussen composed with the assistance of Orb Producer Suite.*

Lastly, **(4)** the final piece provided to the listeners was a *deep house* styled music fragment taken from a piece "Just in Time" by a Swedish music producer and DJ La Fleur. It is most likely created without the assistance of AI, as there is no information that it can be otherwise. That, of course, makes conducting arguments a shaky process. The reasoning for this choice was that the piece is of similar style as the track produced by Mikkel. Also, I wanted to use a commercial track that can be heard on the radio because it was interesting and important to see if the participants can tell which one of two tracks of similar style was created with the assistance of AI. In terms of copyright law, I am using this piece as an example on the grounds of fair use for research purposes.



Audio excerpt 4: "*Just in Time" by La Fleur.*

The participants of the experiment were aware that the examples included music created with the assistance of AI, but they did not know how many (it could have been one, two or all of them). After the listening session (conducted individually with each of the participants, so the opinion of other informants would not influence other participants), we would talk about their backgrounds and experiences, what story do they hear if any, emotions they feel *et cetera*. That is to gather lived experiences of people and to see if people can see as strange or distinguish such music created with the assistance of AI and whether experiences of different people are similar or contrasting. This would potentially raise interesting or controversial discussions for the understanding of both incorporation of AI into musical storytelling processes and understanding musical storytelling itself.

2.2.6. Additional Dataset From the TANT9 Ethnographic Inquiry Project

In addition to the experiments already mentioned, some of the data collected during the TANT9 project was reused to prove some points further and give them more weight as the TANT9 project had a very similar technology and topic and there were some patterns repeated during this Thesis project. The TANT9 project investigated musical creativity relation to

utilizing AI assistant software and musical storytelling, meaning and emotions is something that is a part of creativity, so that allowed for lines to join and arguments to be drawn.

The core of the empirical dataset collected during the TANT9 project was a two-month ethnographic experiment where 3 participants (Villads Flyvbjeg Klint, Tuhfe Göçmen and Athanasios Barlas) tinkered with Magenta Studio and attempted to produce some original tracks. In between, the process of tinkering, regular feedback sessions with the participants were also held. During the project, there was also conducted an interview with an expert in the field - Marco Scirea. He completed a Ph.D. in Affective Music Generation and its Effect on Player Experience from the IT University of Copenhagen and now is an assistant professor in Maersk Mc-Kinney Moller Institute at the University of Southern Denmark (Banytė and Kara 2019).

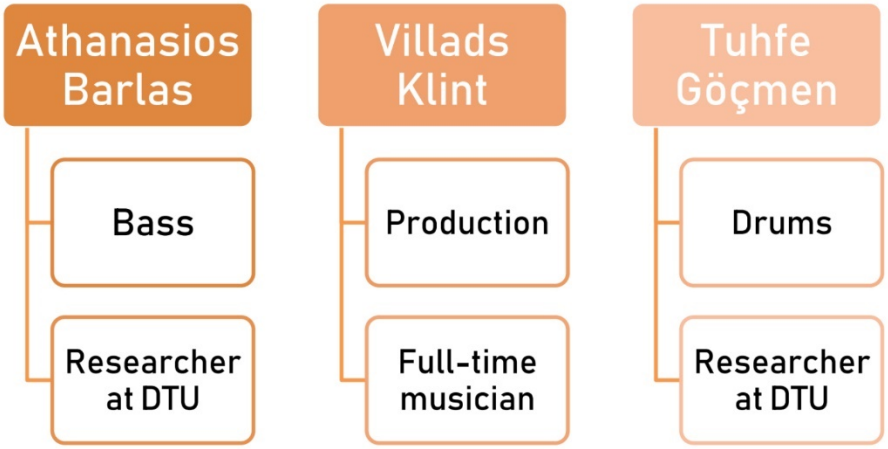


Figure 6: *Participants of the TANT9 ethnographic experiment*. Source: *Banytė, Monika, and Atakan Kara. "AI in Practice: Ethnographic Experiment with Magenta Studio." Aalborg University, 2019.*

3. Theoretical Framework

This section will explain the theoretical framework which is used for analyzing the empirical data collected for this Thesis. The theoretical framework is, to a large part, based on the Post-Phenomenological philosophy of technology and its concepts of *technological mediation* and *human-technology-world relations.* The main reason for choosing this particular theory is the inextricable relationship between music and technology both in the past and the

present and the fact that the topic of musical storytelling, meaning and emotions because of its innate intimate and sensitive nature invites to analyze human and technology relationship on a micro-scale. Post-Phenomenology is a very suitable theoretical perspective for such an endeavor.

3.1. Introduction to Post-Phenomenology

Post-Phenomenology is a type of philosophy of technology that was developed in the 1980s and had a significant impact in how technology and its relationship to humans and society are viewed and understood (Verbeek, ed. by Achterhuis 2001). Post-Phenomenology, to this day, serves an important role of understanding technology and keeps evolving with technology, quickly becoming more and more complex (Verbeek 2011). The roots of Post-Phenomenology come from Phenomenology. Phenomenology is a philosophical branch that studies phenomena from a first-person perspective: it sees human experiences, senses, and emotions as a part of world understanding rather than just a distraction (in contrast to The Cartesian understanding of the world). When talking about Post-Phenomenological views on technology, in contrast to Phenomenology, the former does not see technology as merely an external object that is separate from human beings (Verbeek 2005). The "father" of Post-Phenomenology is considered an American philosopher of technology Don Ihde. One of the most influential writings of his where the philosopher also introduces the *technological mediation theory* and its *relations* is *Technology and the Lifeworld: From Garden to Earth,* which was published in 1990 (Verbeek, ed. by Achterhuis 2001; FutureLearn 2020). These *relations* will be explained in detail later in this section. The thought that technology is evolving at a swift pace and becomes increasingly complex does not sound surprising. Due to this complexity, Dutch philosopher of technology Peter-Paul Verbeek argues that "classic" *technological relations* are not enough to understand the most sophisticated modern and emerging technology. Thus, the philosopher introduces a set of additional relations of *technological mediation*: *fusion*, *immersion*, and *augmentation* (Verbeek 2011; FutureLearn 2020). Yet the technology discussed in this Thesis is not as complex; however, I felt the need of presenting these new relations for contextual reasons.

3.2. Technological Mediation and Other Important Concepts of Post-Phenomenology

One of the key concepts of the Post-Phenomenological point of view on technology is its concept of *mediation*. Technology is not just merely a tool or object that is separate from a human being but a mediator (Verbeek 2001). Technology mediates the world to humans: *"The central idea in mediation theory is that technologies do not simply create* connections *between users and their environment, but that they actively help to* constitute *them."* (FutureLearn 2020). For example, a telescope is not only a tool to see objects that are too far away for the naked human eye to see but it also transforms the way humans see the world (Ihde 2011; Verbeek 2001). Another example is the usage of cell phones and intelligent speed adaptation: *"Cell phones help to shape how human beings experience each other, while intelligent speed adaptation technologies help to shape people's driving behavior in cars."* (Future Learn 2020). In the case of music technology, synthesizers, for example, are not simply instruments but mediators that form the way humans can hear sound and make music. Musical artificial intelligence, due to its potential abilities to make creative decisions and evaluations, can potentially organize how musicians perform creative tasks. In turn, this can lead to change of musical output produced, which then could impact listening habits and music tastes of creators and, finally, in turn also affect listener's experiences, which, of course, can lead to certain behaviors. Musical AI technology also mediates organization of musical structures to be used in music and what rules (musical harmony, measure *et cetera*) should be applied. In the case of Orb Producer Suite and Orb Composer, this organization is based on a Western musical system that most Western musical pieces follow. Yet, in reality, this is not as simple as that and, as it was discussed earlier in this Thesis, the development of this current Western musical system and values contains controversies and viewing it as the most advanced and superior can be questioned. However, of course, it makes much sense that musical AI is designed in this way because of current societal acceptance and familiarity of these structures. Angles at which one can look at *human-technology-world interactions* are *practice dimension* and the *dimension of perception*. *Practice dimension* can be divided into *micro perception,* which deals with a question „how do we act?" and *macro perception,* which asks, „how do we engage with the world around us?" (Verbeek 2005; Future Learn 2020). Finally, a concept that is also important to Post-Phenomenology is *intentionality,* which makes the development and design process of technology a highly responsible activity because technology shapes human experiences. In the case of this Thesis, musical artificial intelligence software shapes experiences of musicians and listeners:

"Human experience has an intentional structure: human beings are always directed toward reality. We cannot simply "see," but we always see something; we cannot simply "hear" but always hear something; et cetera. We cannot understand human experience without taking into account this intentional directedness towards the world. In all of the human-technology-world relations Don Ihde analyses, technologies mediate this intentionality." (FutureLearn 2020)

3.2.1. Don Ihde and the Relations of Technological Mediation

Don Ihde introduces four *mediation* relations that nowadays are sometimes seen as "classic". These technological relations are *embodiment, hermeneutic, alterity and background*. The most relevant relations to this project are *embodiment* and *alterity*. Thus these relations will be explained in relatively more detail.

- Embodiment:

On a basic level, *embodiment* relation can be described as a process of a human embodying the technology. The two merge, and at the same time, the technology also expands human bodily abilities (Ihde 1990, 2011; Verbeek 2001). When talking about Orb Producer Suite and Orb Composer, the AI software helps to come up with musical ideas or to develop the idea further, especially when one has a "creative block". The musician does not merely interact with the software but develops a closer relationship, since a musician presents the AI with his or her ideas and the machine expands them. Schematically *embodiment* relation can be illustrated in the following manner:

(I-Technology) → World

- Alterity:

Alterity relation can be described as an interaction with a *quasi-other* or, in other words, an anthropomorphic entity. The world, in that case, is in the background. Some examples of the alterity relation can be operating a machine (Ihde 1990, Verbeek 2001; FutureLearn 2020). At times, and in the particular case of my Thesis, it can be difficult to distinguish the *embodiment* relation from the *alterity* relation. As the empirical data analysis, which will be presented in the following section of this paper shows, the promises from Hexachords and their AI software do not always sync with the needs of the users. In theory, Orb's AI should expand capabilities

of a musician and, in a figurative way, make the musician a "cyborg" who, before using AI, could not produce music as fast or as efficiently. Yet, in practice, some informants explain that the AI software for them can feel more like some obstacle and an "another being" to who's needs and instructions one has to submit in order to produce some music. Furthermore, the music produced often was described as something foreign to the informants-creators and also not connected to their individual expression needs. This disconnection can be interpreted as a process of interacting with a machine rather than merging with the technology. In other words, making music with Orb Producer Suite and Orb Composer sometimes can feel more similar to taking money from an ATM where one has a goal to get some cash and in order to achieve this goal one follow very specific instructions rather than expressing yourself through the usage of technology (which could be described through the *embodiment* relation). Now a musician instead of focusing on self-expression has to follow specific actions in order to produce some music that feels distant and impersonal and only serves a purpose, as does cash. Schematic representation of the *alterity* relation looks like this:

I → Technology (-World)

- Hermeneutic and background:

The two remaining *mediation relations* introduced by Don Ihde are *hermeneutic* and *background*. They are less prevalent to the data collected for this Thesis but are still present and important to mention. *Hermeneutic* relation can be described as technological translation: "Hermeneutics is concerned with interpretation and focuses on the question of how the world is there for human beings." (FutureLearn 2020). This means that technology can mediate how people understand the world (Ihde 1990; Verbeek 2001). One example is a thermometer – it allows people to visualize temperature. If to take an example from music technology, it can be various sound equalizers (especially digital) because they allow one to visualize sound waves and treat them not only by hearing them through your ears but also to see them visually. Schematic representation of this relation can be illustrated in the following manner:

I → (Technology - World)

The last relation I would like to introduce is the *background* relation. Some technological artifacts do not directly interact with humans and only work in the background. Nevertheless, they still have a significant impact on mediating the world (Ihde 1990; Verbeek 2001). Some examples of *background* relation are phone notifications, a freezer working in the back of the room,

an air conditioner or acoustic treatment used in recording studios. Schematically this relation looks like this:

I (Technology / World)

3.3. Technological Scripts and the Anticipation of Technological Mediation

Another scholar that talks about technological *mediation*, yet from a slightly different angle, is French philosopher, anthropologist, and sociologist Bruno Latour. Regarding the topic of this Thesis, not only technological mediation is an important theoretical perspective but also something that Latour describes as *technological scripts*. I am adding in this perspective to further expand some of the points that I will be making in the analysis of this Thesis. According to the philosopher, when a designer creates technology, he or she inscribes one or another script into the technology:

> *"Latour indicates the 'built-in' prescriptions of technologies as scripts (Latour 1992, 259-60). A script is a the program of actions or behavior which an artefact invites, expressed in words similar to the series of instructions of a program language. The designer of a technology thus works with an inscribed user in mind, to whom he prescribes properties and behavior. This does not mean that users automatically act exactly in the way the designer intended; they also have to subscribe to the inscriptions (Latour 1992, 236)."* (FutureLearn 2020)

One example that Latour uses is speed bumps. They force the driver to slow down and to obey the law. The designer created speed bumps so that drivers would not go too fast and break the law, thus, in turn, "installing" this prescription into the technology (Latour 1992, ed. Bijker et al.; Verbeek 2011). Orb Composer and Orb Producer Suite software, as already mentioned, both make use of traditional Western music system, among other things. However, when looking into all music that exists in various cultures and even in Western music culture as well, Western music core rules (tonality, harmony, forms and so on) are not the only way to create music. Yet, when using the software, the user is more or less forced to either follow these rules or stop using the software. These problematics of the software cannot be discussed in isolation. It is a much broader topic and one starting point is, for example, today's musical instruments and their tuning methods and musical harmony, which can also be seen as technology. Furthermore, not following these aforementioned rules most often has negative reactions both from the audience and from other musicians.

Moreover, the phenomenon of technological *mediation* is even more complex and intricate than described in the previous paragraph. It is not an easy task to anticipate in which way the technology will affect human behaviors and experiences. This is due to *multistability* of technology. Meaning that the effects and experiences of using technology will always depend on a context and different types of users. There are examples through history where technology was designed for one purpose, but users started using it for a very different purpose. Peter-Paul Verbeek sees this complexity as intermingling of users, designers, and technology (**Figure 7**):

"in all mediated human actions and interpretations, three forms of agency are at work: (1) the agency of the human being performing the action or making the moral decision, in interaction with the technology, and appropriating the technological artifact in a specific way; (2) the agency of the designer, who, either unintentionally or in deliberate delegations, gives a shape to the technology and thus helps to shape its eventual mediating role; and (3) the agency of the technology mediating human actions and decisions, sometimes in unforeseen ways." (Verbeek 2011)

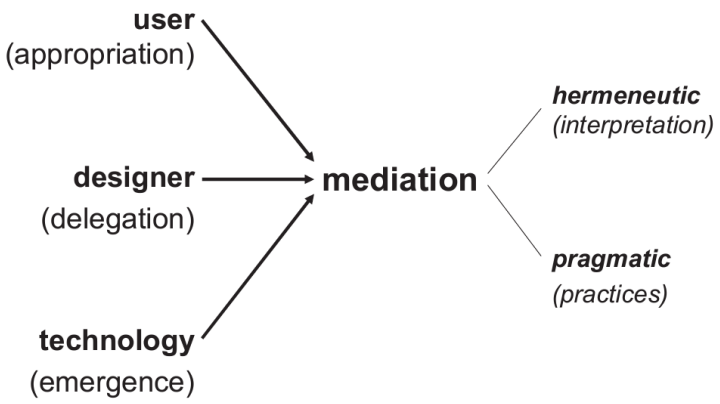


Figure 7: *Agency and sources of mediation, according to Peter-Paul Verbeek.* Source: *Verbeek, Peter-Paul. Moralizing Technology: Understanding and Designing the Morality of Things. Chicago ; London: The University of Chicago Press, 2011.*

4. Analysis

In this section, the theoretical framework that was explained in the previous chapter will be applied to analyze the empirical data collected. Following themes emerge from the data collected: (1) sound and mediation of musical storytelling, meaning and emotions, (2) mediation of listener's experience, (3) musical ideas and assistance of artificial intelligence, (4) intuitive and rule-based creativity, (5) machine as a creative partner, (6) creative decision making, (7) mediation of inspiration, (8) hermeneutics of usage of musical artificial intelligence software. In the following paragraphs, these themes will be analyzed using the Post-Phenomenological approach that was introduced in the Theoretical Framework section of this paper together with some other empirical and experiential perspectives that emerged organically during the process of working on this Thesis.

4.1. Sound and Mediation of Musical Storytelling, Meaning and Emotions

As Don Ihde discusses, everything starts with sound (and especially when talking about music…) because sound is the source and the roots of language (Ihde 1976), I would also like to start by analyzing the mediation of sound when using artificial intelligence for creating music. Interviewee Oscar has been using Orb Composer software for about a year. In general, he uses many different technological tools in his creative process. It appears that usage of various music technology tools helps Oscar to find inspiration and fresh ideas. One of the most prominent tools he talked about in our interview was synthesizer and its role of sonic inspiration. The interviewee gets very inspired and excited by sounds and, of course, as he stressed during our interview, the sound of a synthesizer.

Artificial intelligence understands sounds differently and there are several reasons for that. One of them is that human hearing is largely biological. AI, in a way, transforms hearing and gives it a new form and, in turn, invites to have a different understanding of sound. One of the reasons why it is so difficult and problematic to incorporate AI into the creative musical storytelling process is because people and machines hear sound differently. In the case of several interviews conducted during the empirical data collection of this Thesis, sound and its aesthetics among other things was one of the key elements that inspired the informants and provided the listeners with affects and in turn, helped them to feel emotional or (and) later express these or other emotions. It can be described that hearing sound very often sparks creativity and helps to express musical ideas. With the incorporation of AI, yet another element

comes into play. Artificial intelligence is an element that "hears" music differently. AI perceives music as purely MIDI - numerical data. However, that is, in the case of using Orb Producer Suite and Orb Composer software. There are AI that can also deal with raw audio but in this project, such software is not the focus. Perceiving music as MIDI – numerical data is again different from human way of listening. "Humanlike" process of generating ideas and building on top of other music and, in turn, developing the ideas (this can be, in other words, described as musical storytelling). Furthermore, those ideas depend on sound. Informant Lars talked about getting inspiration from the sound of claves (a percussion instrument made of wood) and making a musical piece-story from this inspiration:

"This is a good example. For instance, this is a piece for which we found out that, you know, if you have this two pieces of wood called claves and we give them to all the dancers they, and they are making rhythm on stage. This means that the dancers are making sounds, musical sounds; And that was the first idea." (Lars Wellejus 2020)

Figure 8: *Claves. Source: https://commons.wikimedia.org/wiki/File:Claves_hg.jpg.*

4.2. Mediation of the Listener's Experience

I would like to continue the analysis by starting to also bring in the listener's perspective. What does the incorporation of AI in the music-making process mean for listeners of that music? One of the most significant factors for enjoyability and emotional effectiveness of music that I observed both when interviewing the listeners and doing the literature review was the

unexpectedness factor. When interviewing the listeners that was one of the considerations, they used to argue that one or another piece of music presented to them was created with the assistance of AI. At the same time, these accounts showed to be contrasting. If we try to follow the listeners because their perception and opinion towards the music produced matters substantially to the topic of this project, then it turns out that those opinions can differ quite a lot and in contrasting ways. Moreover, the listeners, while listening to the same music pieces, can see very different visual pictures and stories. As already mentioned before, the act of musical storytelling and what stories (for example, visual stories) that listeners perceive is a subjective experience.

When by the end of the listening experiment, which was already explained in more detail in the Design of the Empirical Data collection section, I suggested playing a simple guessing game in which informant Jasmina was introduced to four music pieces (one created by informant Lars without the assistance of AI, one official demo created with the assistance of Orb Composer, one piece by informant Mikkel created with assistance of Orb Producer Suite, and finally one "radio friendly" piece of music of a similar style to that Mikkel has produced) and had to guess which ones (or one) were created with the assistance of AI. She associated more messy and explorative musical structures and connections within these structures with music created solely by a human and explained her choices with those structures being more explorative and less mathematical. From this, it might appear that there are some tell-tale signs that can actually differentiate music created using the assistance of AI or rather as seen in other parts of the analysis even this usage of AI pushes towards the use of certain music structures and putting them together in specific ways that are appropriate and useful when using Orb Composer or Orb Producer Suite. However, this hypothesis starts to shake when another participant of the listening experiment associated messiness and unexpectedness with music created with the help of the machine, because, according to her, a human would be able to produce more polished results than a machine. Because of lack of composing skills, a machine would produce more random results. It is understandable, that the fact that the listening examples included assistance of a human made it more tricky to guess and tell a difference. Nevertheless, that is again precisely why that is even more interesting at the same time. All in all, this fun listening experiment showed that it is almost impossible to tell music apart that was created with and without the assistance of AI.

One interviewing experience that got stuck into my mind from the listening experiment was when the participant Kat, who when they first heard a piece by the informant Mikkel that

was created with the assistance of artificial intelligence of Orb Producer Suite, made a comparison between the track and tracks that can be made in a life simulation game Sims. The game is based on recreating real life situations, simulation of a lifeline by manipulating your created character or characters in a computer game setting. This character can perform many things that are possible and also impossible in real life. These actions also include a *sim* being able to have a creative personality and to create his or her own music.

In general, according to the listening experiment that was conducted for this Thesis, it is interesting that AI-assisted music pieces can invoke feelings. And sometimes, depending on the individual person, can even invoke higher amounts of feelings even than other types of music created without the assistance of artificial intelligence. AI, in this case, can be seen as an actant that can mediate emotions and meanings in a different and automated way.

In terms of the participant's opinions in general of what they think of the integration of AI in music production, in general, there is a consensus of a neutral view with a slight leaning towards the more positive side - and it merely depends on how you use it. A participant of the listening experiment, Jasmina, also added that this listening experiment and the music pieces that she was asked to listen to were an excellent example for understanding and seeing of what AI is capable of right now.

4.3. Musical Ideas and Assistance of Artificial Intelligence

When telling a musical story, the ideas that are the puzzle parts of the story are almost always mediated through usage of music technology. Informant Oscar uses the Orb Composer software mainly to generate ideas. In general, for him, it acts as an addition to other tools rather than his main focus of usage. Even though it might sound counterintuitive, idea generation has a very long history of being almost dependent on technology. In the past, before the introduction of a personal computer and the subsequent digitalization, this technology was, to a large extent, musical instruments (except for various hardware effects that also, of course, mediated generation of musical ideas in various ways). Nowadays, this process often includes a wide variety of various technological tools – both software and hardware and, of course, also "traditional" instruments. Artificial intelligence technology adds to this a different and fascinating level. There are several ways a musician can generate musical ideas and talking from experiences from both being in the field and interviewing and observing musicians and meeting

musicians while engaging in my own musical endeavors, these ways can vary a lot. There is always something interesting and slightly different about each musician's music-making process. However, some common ways that can be observed are: using his or her musical imagination or in other words brain and bodily senses, by improvising and using a musical instrument by physically playing with it, and by somewhat generating ideas using various technologies: synthesizers, samplers, samples or recently also AI technology. If without using any technology, a musician would come up with a musical idea in his or her own head based on previous experiences and (or) sounds that inspired him or her. If improvising using an instrument, the *embodiment* relation starts to become visible. While playing an instrument, the musician embodies the instrument. A musician transfers his or her mental capabilities, ideas, emotions, and senses to the instrument. In the end, the musician expresses his or her ideas, emotions, or senses through this instrument. The outcome is inevitably mediated and, in many ways, depends on the instrument. If talking about such technologies as AI and also synthesizers (especially modular), which in a nontechnical way could be called "idea and music structure generators", they create *embodiment* Post-Phenomenological relation. However, they are not necessarily dependent on bodily sensations. Such tools act as a mental extension of a human being and his or her ideas and emotions. The musician's ideas usually provide the initial creative input. After using this tool – usually through pressing some button or a similar control, the software or hardware tool spits out an idea or series of ideas that the machine-tool created based on your input. There is a certain symbiosis between a musician and a tool. New musical structures are created that previously could not be made. Ideas are being altered, expanded and created in a new way through technology as a mediating extension. That, of course, has a direct impact on the musical result, musical structures, in turn, musical stories produced and, finally, the listener's experience. Not to forget that every musical piece has the potential to inspire and to influence other musical pieces and to provide new ideas. Yet this technology (in this project's case – AI) cannot be seen as merely a lifeless tool. For one thing, its design is based on a large mass of previous music tools created by humans and also on musical rules, musical theory, which was developed through years of cultural, scientific, experiential, emotional, artistic, and other varied and sometimes untraceable developments. Even in that way, it is already an extension-mediator of a human. This technological extension not only influences humans, but humans also influence the development of this technology. That is, as explained before, one of the key points of the *mediation theory* and that is quite clearly visible here.

On a larger scale, AI is a technology that cannot be separated from a human to an even more significant degree than other technologies. That is, of course, in fact, true when talking about any technology according to the Post-Phenomenological point of view (Botin 2015). At the same time, with the artificial intelligence software that is designed to assist when creating music, this link appears to be even more strong. The AI experience, at the same time, is made from human experience and is a part of this experience. From early on, it has always been a symbiosis based on the connection between humans and technology (Botin 2015). For example, AI itself is fed with massive amount of human music. This music was influenced by many factors which are of a varied and often not very clear and mysterious nature. These influences are and could be political, social, socio-cultural and of course, it is influenced by musical instruments and musical systems that were created by humans but at the same time influenced by technologies. That is another reason why artificial intelligence technology cannot be this separate and potentially dangerous evil technology but rather a reflection of human history and experience, which has a potential to create new experiences and integrations.

4.4. Intuitive or Rule-Based Creativity?

Musicians interviewed in this project all had one thing in common: for them experimentation or as some called it, exploration and as the informant, Oscar called it – losing control was very important. In other words, the whole act of not following rules had a significant value. Another participant – Lars, even got very angry and frustrated that now he has to follow the rules of what he described as a very classic and very traditional *rule-based* way of making music that he did not like and that the machine now almost forces him to submit to its ways of working and rules. Going back to Oscar, in contrast to Lars' experiences, he told that Orb Composer software helps him to let go and to lose control. Because of AI, as described by Oscar, is this almost a living and unpredictable being. That is again in contrast to Lars, who called it very predictable and even added that the software is making his music sound not like his but like everything else. Oscar also draws a parallel with AI and analog synthesizers. He paints an analog synthesizer as a living being because results produced using an analog synthesizer are never the same - sometimes even electric current influences results, among many other factors.

From the Post-Phenomenological point of view, there again, an *embodiment* relation can be brought in. Looking through the lenses of neuroscience, the idea generation happens in

the sub-consciousness of a human being because letting go and being in a flow to a large part happens in the sub-consciousness. So, instead of this flow process happening in the musicians' head, now this process happens in the AI technology. A musician can now merge his or her subconsciousness with the machine's version of a similar matter. As the author of Unthought, Katherine Hayles states, this process that AI does is actually more similar to brain sub-conscious processes than to conscious processes (Hayles 2017). If there would be no AI involved, a musician would need to depend on his or her brain but now a machine mediates this process of letting go. All at the same time, there is less and more control or agency. Of course, as also mentioned in the previous point, a musician again can or even has to edit the end result because the musical idea that the AI generates often is not good enough or does not seem suitable, and in any case, neither Orb Composer nor Orb Producer Suite were not designed for that anyways. It was designed to be an assisting tool for a musician. As already mentioned in the introducing chapters of this Thesis, all the interactions with a musician and technology that happens in today's music production process are constant back and forth interaction with technology: generating sound, its tone, shape, form and other features and then musicians again deciding what to do with the results over and over again. AI, on that level, both takes over some of the tasks and, at the same time, gives more and different tasks to humans. For example, a human is left with a decision of what to do with those structures that AI has created. However, now a musician has more time to think about other things. For example, aesthetics , color of sound and finally even the actual final story instead of focusing on sometimes desperately finding new ideas to make musical connections that will sound good and help the story that a musician wants to tell a reality.

If taken in isolation, one of the clearest, the most interesting and mysterious differences between creative artificial intelligence and human beings in their creative process are their acts of exploration and the trial and error process. AI cannot explore, make errors and learn by finding interesting concepts, combinations, and solutions through making those errors. At least not in the same way as a human as it can also be argued that AI can, in fact, explore but its process and the definition of this process are simply different. In the example of the informant Lars, his creative storytelling process is often based on being inspired and listening to sounds that, at times, are not necessarily from musical sources. In addition to this, Lars most often starts his musical storytelling process with an idea that is not even a musical idea but conceptual. Of course, AI's creative process also starts with an idea – a human's idea that has been fed into it. But it does not come from such a unique set of experiences and senses, as in the

case of a human being. Machine learning techniques in the Orb software try to emulate these things in a way, but, of course, it does not come "too close" to the "human way". What does that mean in relation to Post-Phenomenological? Artificial intelligence can be used as a means for mediated exploration: another participant Oscar uses the Orb Composer tool to generate ideas and to get inspired. In a "normal" case that would happen in a human's head. However, at the same time, not entirely. Idea exploration of a human being is not only a cognitive action but also sensory. Artificial intelligence software, at least in the case of this project, cannot generate ideas based on sensory experiences. However, I am talking about this matter not because it is somehow detrimental that AI cannot fully replicate human musical storytelling, meaning and emotional expression through human-like senses. This does not matter because I am analyzing AI as an assisting tool to human beings and not a separate being that can create music on its own or is trying to recreate humanlike abilities or possibly even improve them. These points would raise an entirely different discussion.

Jumping back to the thesis topic, now a creator that uses Orb Composer software embodies technology as an additional source of exploration that is in some ways more convenient and, at the same time, helps to think in different ways. In a "normal" case, the creators mediate their ideas through themselves by following their ideas. To compare it to AI – now a musician sends the idea to AI, and it mediates it – develops it to its liking. After this, the process is again in the hands of a musician. This changes both the musical result and, in turn, experiences of a musician and listeners but also changes or rather increases the hermeneutic understanding, because a musician now is presented with a new sonic variation of his or her own creation. Nevertheless, a discussion arises whether over time these ways actually would become the same ways, since Orb Composer software is trained on the same "stagnant" dataset. Possibly the ability to train the software on a different dataset or one that consists of a musician's own creations would help to solve this issue. In addition to this, if the AI's capabilities of training through time would be more advanced, that would also possibly improve the situation. Training through time is more possible in open source AI software such as Magenta Studio. However, I will leave further discussion for the possible solutions for the Discussion section of this paper.

Moreover, participant Lars at the end of the experiment showed a substantial amount of frustration towards both Orb Producer Suite and Orb Composer Software. Lars explained and described these frustrations in several illustrative ways. First, the main reason for these frustrations was, according to the informant, the fact that usage of this software and the results produced are based on classical *rule-based* music and traditional composing. Lars has

experience and knowledge of classical composing and theory, however, as it will show in more detail later, prefers a more intuitive, sonic and experimentative approach over the strict and *rule-based* method. The musician embodies the AI and it helps developing the musical story. And, according to Lars, it does it in a very traditional way - a strongly *rule-based* way. From early on, it appears that "non-classical" composing is very important to him. When asked to talk about his usual creative process and how he expresses a musical story, it became very clear that the participant has much experience and has worked with a wide variety of music, so it is hard for him do describe his process – at least harder than compared to other participants. Nevertheless, when asked to talk about one specific example, he picks one of his pieces he created for dancers and goes on to describe it in the following manner:

"And I need something there, maybe some fills and I don't know - all kinds of things you into it. So, it's not, this this is not a B, A, B, C piece or classical composing or anything like that." (Lars Wellejus 2020)

One of the music rules that Lars encountered was *the circle of fifths*. It is directly related to the equal temperament system that was discussed earlier in the Thesis. Lars also mentions the II-V-I chord progression rule. That is a classic chord progression that is again directly related to the equal temperament system and using "the right chords" that are perceived as satisfying to listeners and, of course, also the composer. Here there is a *technological script* inscribed that urges the user to follow these rules; otherwise, it is either impossible to compose, or the composition is "wrong".

Secondly, another set of thoughts about the frustration regarding the Orb software that Lars talked about was that, according to his experience, the more he tried the program, the more it sounded like anything else. He joked that suddenly he started to sound like blues or Frédéric François Chopin, which was not his goal, as he wanted to sound like himself at the end of the day. Coming back to the previous point, the informant felt restrained and annoyed him by such a heavy reliance on classical composing rules, which in turn produced results that to his taste were too generic. To him, using Orb Composer and Orb Producer Suite felt like being trapped under the control of the software rather than having an ability to express himself.

To further expand the point, many popular music technologies that are used to edit music and especially *electronic* and *popular music*, are in one way or another already directing the user towards the pursuit of perfection and math like structures. Here again, there is a *technological script* inscribed that urges the user to follow this math and rules direction. So many

phenomena that are related to computers are actually mathematical to their core and it is in a way impossible to design things differently. This, in turn, leads to music being created in the more mathematical way rather than emotional and raw. For example, when a musician plays his or her part, he or she is forced to play it into the rhythm, meter and harmony because of the nature of a modern studio recording process and the design of digital audio workstations (Warner 2003). Being able to play in time and with "perfection" is seen more superior to natural human imperfections and deviations when talking about the studio setting, which to a large part, describes the music creation process of contemporary Western instrumental music (except for classical and some other types of music). So, when finally, one connects both AI and these already mathematical structures, the musical outcome becomes even more *mathematical* and *rule-based*. Human embodies mathematical and mechanical musical structures into their perception and musical expression. The resulting stories become more polished than the person originally would have made without this technology.

However, after performing this process of exploration, much editing still has to happen. This means that the integration of artificial intelligence, in essence, does not change the editing stage - it should happen in any case. The integration of AI software mediates the idea generation process-stage and, to a smaller degree, the decision-making process of musical storytelling. The integration, in some cases, can make the mentioned stages faster because the exploration stage can now be skipped. The reason why this "humanlike" exploration stage can take a long time is because it is usual for a human being to make a lot of mistakes during the process. Lars explains it as a process of trial and error and going back and forth to explore the possibilities and the world in many different ways. Informant Lars often generates his ideas through and makes decisions through experiencing, sensing and exploring:

> *"But then what will happen, was my first idea then I tried to make some pieces into some experiments and went into the dance room and tried some small pieces in this tempo, in this tempo and you know, and it was, so it was... I was sitting home working in the dance studio, looking, observing."* (Lars Wellejus 2020)

Lars also explains that this process of exploring can be inspiring in itself. This can be seen as an important insight because even though it can be faster to make music with the integration AI and what would be the point of that if the process itself is not pleasurable? If the process does not provide joy, it can have demotivating results even, and for some people to

diminish their creative capabilities rather than inspiring, then his might mean that the integration might not be worth it for some people if they do not find the process itself inspiring.

A participant of the first experiment, Mikkel did not find the software particularly inspiring. Even though it was nice to experiment with and it has potential, according to him, he is not planning to use it in the future. His further reasonings are the same reasons as with Lars' who is also not going to use it in the future and in addition was a lot less forgiving for the flaws that he saw in the software. These reasons are, in essence, not being able to connect to the creator's own creativity in relation to output that the software produces. In Mikkel's case, it is also because of the software's inability to follow the creative direction of the informant. Similar patterns of software not being to connect to ideas of the informants also repeats in the old data (TANT9 data) in both similar and different ways. Finally, being inspired or not inspired can be directly related to the musical piece created being passionate and emotional.

4.5. Machine as a Creative Partner

In idealistic futuristic scenarios, a large part of the informants sees and expects artificial intelligence to be their creative partners. However, in practice, using current AI software, these visions cannot be real-sized. When a creator uses a musical instrument, it also becomes an extension of the artist and the creator's senses, thoughts, sonic ideas, and knowledge is embodied and transformed through the usage of a musical instrument. The connection is highly intimate and symbiotic. Moreover, this is how usually musical ideas and, finally, stories are expressed. In addition to the advances of current digital audio workstations and in the past - notation, there are other, more constructive ways to create. However, I will compare those with usage of the AI software a bit later in this Thesis. However, to contrast the usage of a musical instrument and artificial intelligence software, it can be said that it floats in some different category than musical instruments and other tools. Many people speculate it as a creative partner or at least have expectations and visions about AI as a creative partner. Even if AI can be compared to synthesizers, samplers and other similar software, this technology is still something entirely different. At the same time, the capabilities of the current AI software do not meet these visions fully - only partially. This mostly translates through the previously mentioned inability to connect with a musician's unique ideas:

"But in my experience, there was actually was that it was not in sync with me." (Lars Wellejus 2020)

Instead of the envisioned collaborator or and a technology that can be explained and connected through the Ihde's *embodiment* relation, it becomes a separate entity around which one has to learn how to dance. This means that this machine can now be seen through the lenses of the *alterity* relation of Post-Phenomenology. The reason for this again can be the fact that it is trained on other types and many kinds of music, which are not necessarily those that the informant is able to relate to personally. Moreover, the AI does not encompass the life experiences that form the expressions and tastes of a specific musician. The software does not contain the music that is mediated through the informant's musical experiences up until now. This could possess a danger of all music becoming more similar in the long term if the integration of this exact type of AI software would become more and more popular, and eventually become as ordinary integration of a DAW, as any other music creation tool that already exists in the market. In addition, the fact that the AI actually does not mediate telling the personal stories of an informant, but rather pushes towards telling generalized stories can be seen as a flawed characteristic of artificial intelligence. Many would argue that it can be a significant loss of not utilizing something that humans are so unique in and capable of. In reality, all people's listening histories are in one or other way different, and the artificial intelligence software presents one big general bag of musical stories that somehow should "fit all". From a practical side, it works, but looking from a large scale, music becomes very general. As was previously mentioned before - after the second experiment, it became apparent that, in general, people cannot tell AI-assisted and music without the interference of AI apart and even can feel emotions and see their own personal stories in music.

Informant Oscar similarly sees the Orb Composer software - as an opportunity or idea of having a partner. This would allow for working in solitude but having a partner. That would be a higher or a different kind of agency where one has a creative partner at hand and can ask for its opinion or ask for new ideas. However, eventually, it is up to the person whether to follow these suggested ideas. However, in contrast to Lars' experiences, Oscar likes this feel of foreign to his ideas produced by the AI software. The participant seemed to enjoy these different and foreign perspectives and that it gives him different ideas in comparison to his own.

4.6. Mediation of Creative Decision Making

When a musician is creating a musical piece, he or she spends a lot of time on making decisions of what ideas are good and how to build on them to eventually tell a musical story. In the process of a musician using Orb Composer or Orb Producer Suite, he or she sees his or her ideas mediated and further developed through the artificial intelligence software. Similar to coming up with ideas, the musician's process of making creative decisions is again often very intuitive and sometimes can be difficult to foresee. Participant Lars Wellejus talked about this a lot, for example:

"Then often the situation decides what to do." (Lars Wellejus 2020)

In addition to this, sometimes, a decision cannot even be made because the artist does not seem to like it at all. To compare to AI software, the element of uncertainty still exists, but it is more in a direction of randomness and guessing. That is because of the way the Recurrent Neural Networks (RNN) that are used in the software work. As discussed before in The Introduction to the Technology part of this Thesis, the main principle of the workings of RNN is attempting to guess the next suitable element of a musical sequence-based of the body of musical pieces that have been fed into the algorithm. The larger amount of those pieces has been fed, the more these predictions are accurate and suitable (in relation to the body of music that has been fed, not necessarily in general terms). Here AI goes into a process of making its little musical stories. Interestingly enough, looking closer, the human process of making creative decisions is not at all that different. So, what is the issue, then? Maybe now AI can completely replace the human? That is not the case because there is more to this. Namely, one of the main differences between a human and the software is that in human creative decision making and storytelling *versus* that of AI is that human creative process and its outcome is still much more unpredictable. That is because, first of all, the unpredictability and variety of human experiences coupled with the fact that creative ideas and experiences for humans to a large part come from or are synthesized in subconsciousness, which still has many mysteries that are unexplained by neuroscientists. Looking from the other side of the fence, the decisions made by AI, or rather the process of it making those decisions are at least fully known and explainable. Even if my tone might appear critical, this does not mean that this unpredictability is intrinsically harmful. However, this generates an ability to control the creative momentum and, in turn, to have an agency over this. That gives the human a new responsibility, in contrast to the more fearful opinion that it takes away tasks that could have been performed by a human being.

However, one cannot throw this possibility completely away also. I will discuss this issue further in the Discussion part of this Thesis.

Yet, what does it mean in Post-Phenomenological terms? This "collaboration" creates an ability that previously was not available before – the ability to have agency and control over the creative momentum. Without Orb Composer or Orb Producer Suite software, when "getting stuck" on an idea, a musician would not have this particular ability. As with glasses that help to see again (to take a "classic" Post-Phenomenological example) when the abilities of seeing are decreased, the AI software help to "see" new ideas when the human ability to come up with new ideas is for some reason diminished. In turn, this changes human experiences and, at the same time, experiences of listeners because the structures and ideas that are provided by AI and later mixed with other ideas are involved with artificial intelligence and would be different without it. This ability to come up with decisions can save time but then again, it is not as simple as it seems at first glance. For one thing, a musician often does not like the ideas and decisions that the machine has come up with. But the software can provide some ideas at least if you have none and happen to be in a state of a "creative block". That is especially important when working in the commercial music industry (creating music for commercials and games, music for the commercial music industry, commercial music for entertainment in general and so on). There people usually have not only more clear goals as to what musical stories should be told, what they should tell the listeners but also are under strict time constraints because projects most often have budgets and deadlines to fulfill. Deadline fulfillment, in this case, is very important because of the involvement of variety of stakeholders in commercial music-making and responsibility towards them is bound by law and often would have negative economic impact in case of not delivering on time. All in all, AI assisting software becomes a mediator in telling a story and meeting the delivery deadline.

4.7. Mediation of Inspiration

This ability of being to overcome a "creative block" is important not only in commercial music context but also for those who create music as "art for art's sake". First of all, this ability might help to make the process more pleasurable and enjoyable. That is because this usage or Orb Composer or Orb Producer Suite can prevent from feeling frustrated when getting stuck and not being able to come up with an idea. Secondly, being stuck on an idea can also mean that a musician that is "in the zone" at the moment and feels some kind of emotion or

remembers some situation in his or her life and now wants to express it, and, for example, sits down, turns on music-making software and suddenly realizes that he or she cannot come up with any idea that he or she likes, the AI software at least helps to express and connect emotions (because any new idea can make it easier to connect to a new idea). Finally, by the time the composer finally finds a suitable musical structure, the emotion is gone, and it is harder to express and recreate this emotion because it is not as present in the head and senses of a musician. In an alternative case, a person could quickly generate many different ideas and chose from the emotional expression parameters in Orb software that more or less fit his or her mood and quickly have ideas and continue to develop from them and thus preserving the "creative momentum".

Second, the usage of the AI software can help provide fresh ideas. Informant Oscar uses Orb Composer in this way. He explains that the software provides him with new and surprising ideas and, in this way, inspires him. According to Oscar, this element is crucial to him and the participant also compares this experience to using a synthesizer that also surprises him and provides inspiration. Being inspired and the source of this inspiration is more important than it might seem at first glance. A musical piece can be seen as a series of many magical bridges that must be all connected in order to continue to tell a story and by the end not fall apart. Each idea can be a bridge for another idea and is reliant to one another and also inspires one another (imagine bridges that all both similar but also at the same time of different sizes and shapes and magically influences one another. To turn the topic back to the AI technology, it can be speculated that this happens because of the fact that the software is trained on a different music asset than the informant's listened music and that provides a sense of freshness.

4.8. Musical Artificial Intelligence Software and Hermeneutics

Mikkel, who besides creating music at the point of writing this Thesis, was attending a school for higher music education and also has experience in teaching music to children, pointed out a set of interesting points and thoughts. According to him, Orb Composer software could help learn about music theory and composing music:

"It's really good for teaching. Am... Teaching, like scales and chords and understanding composition and dynamics of composition. Because it's these blocks that they've created."
(Mikkel Rasmussen 2020)

This means, looking from a Post-Phenomenological point of view that this technology could mediate learning. To dig even deeper, it has an ability to translate the world (existing musical rules, structures, and knowledge) to people. Here the *hermeneutic* relation comes into play. The usage of such technology might mean that it forms the understanding of music as a system in a certain way, namely in the way the program shows. And that is more or less the classical and Western rule-based understanding of music. The process using Orb Composer and Orb Producer Suite is primarily based on the usage of MIDI (Musical Instrument Digital Interface) technology. This provides another interesting hermeneutic perspective.

5. Discussion

The more in-depth analytical look again proves that the recent developments of artificial intelligence are very complicated in both interesting, exciting and scary ways. Artificial intelligence is one of those technologies that need a high level of responsibility and diligence when developing further as, according to many, it has the potential to provide immense and exciting possibilities but also poses some potentially adverse developments. Thus, it is important to both look at AI with responsibility but, at the same time, not to forget that new and emerging technologies often scare people at first but later become a normal and even an intrinsic part of life. This has already happened multiple times through history of music technology – multiple new technologies were seen as "the end of the music industry". When Bob Dylan started using an electric guitar instead of acoustic in his performances, he was met with great anger because electric guitars very considered "evil pop instruments," but at the moment electric guitar is a very prominent and well-liked instrument in many musical genres; introduction of digital music distribution on the internet was supposed to be the end of the music industry because of the rise of internet piracy, but music streaming services, such as Spotify became possible. The list goes on. In this project, I am taking a neutral and stance towards every technology and employing critical scientific thinking; I would like to stress that in case a few previous sentences appeared as merely praise for artificial intelligence and agitation of its integration into musical storytelling and meaning and emotional expression processes no matter what. All in all, the integration of artificial intelligence music creation assistant software such as Orb Composer and orb Producer Suite brings both major concerns and possibilities for improving the musical storytelling processes.

Artificial intelligence technology needs more attention, and its developments on a larger scale should be discussed more: how to act towards these technologies and how they should or should not be developed. The analysis described these developments and took a deeper insight and, together with the introductory chapters of this Thesis, have produced new knowledge and points of view. Besides, it also gave insights into various controversies, and that is important; however, it is even more critical to take stances (not necessarily ethical, but also ethical if the results of the investigation require that, even though I am taking a more neutral stance). Especially because of the Techno-Anthropological nature of this Thesis. One of the core values and differing features of Techno-Anthropology (apart from an interdisciplinary approach) is its stance towards responsible technology development (Botin 2015). This section of the Thesis will discuss and point out what and how should these matters could be done and what Orb Composer and Orb Producer concerning its users, musicians, means on a larger scale; meaning for both musicians, listeners, the music industry and, at the same time for the developers of music technology – how could they utilize this technology and how it should be further developed to make the best use of it.

In addition to my own empirical perspectives gained both while studying MSc of Techno-Anthropology, I will draw some inspiration from the Techno-Anthropological concept of 7 Es and some of its "Es". This concept helps to raise important ontological and ethical dimensions (Botin 2015).

5.1. How Does Embodiment Of Artificial Intelligence Software Mediate the Creative Process of Musicians and, What Does that Mean on a Larger Scale?

It appears that the usage of both Orb Composer and Orb Producer Suite software creates a new way of expressing ideas and expressing something that was previously expressed as sonic endeavors. On the one hand, this pushes towards losing something that is very humanlike and unique when creating music - using bodily senses, human memory, experiences, smells, imaginaries and so on. And that, of course, on the one hand, possess a danger of losing something inherently human when incorporating the software into the creative process. However, at the same time, a new mode of embodiment is created. A new way to express yourself and explore is found, especially when other ways do not seem to work. If used sparingly and with

other types of creative methods, this adds both exciting and practical dimension to music production, especially if looking forward to the future and continuing responsible development of artificial intelligence for music technology. Even if in this Thesis there was not discussed more types of artificial intelligence technologies that create music without the interference of a musician, assistant software can still possess a danger of music becoming more and more similar to one another as the analysis of this Thesis has shown.

A more careful analysis of those technologies, of course, would be needed to prove this point; however, it still shows some relevance. The strength of humans and their uniqueness seemed to be the ability to explore things, while technology seems to make the production fast and more productive and, finally, overcome a "creative block". While by saving time, AI could be a useful tool for putting mundane and repetitive tasks aside and leaving more space for what humans, according to the data collected for this Thesis. According to literature research and other data, what humans do best are creating unique and original ideas and structures, are intuitive and exploitative; finally, they have unique experiences. It can be argued that AI could become a new addition to the already vast amount of music technologies that exist. Artificial intelligence technology can simply provide one more way to extend human creativity and creates another technological musical embodiment of many.

5.2. How Does the Software Empower Users?

Even if the first instinct might say that AI technology can take the empowerment away from humans by being able to produce music that with more or less involvement cannot be told apart from music created by humans. However, there are also ways that AI empowers people. First of all, a very common and for many creative people challenging and troubling issue is a "creative block". In the art world, there is often a notion about inspiration, and that the artist should wait for it to come. Of course, when one creates "art for art's sake," it might not be as frustrating when suddenly there is a want to express oneself and to write a new piece, but one simply cannot come up with new ideas. This can feel very disempowering and frustrating. Artificial intelligence, in turn, can provide musicians the feeling of empowerment and safety. That is especially prevalent in commercial music fields where there is high pressure and one must produce results, even though human biology does not always want to submit to this and it does not work in an automated way, where one can just push oneself more and work harder and come up with ideas. Sometimes no matter how much time an artist spends, he or she cannot

come up with ideas and that can be detrimental in the commercial music industry and frustrating when creating “art for art’s sake”. However, with such software as Orb Composer and Orb Producer Suite, one can become empowered by knowing that in case you are out ideas for expressing your story that you so want to express, you have the software that can help you in the case of having issues.

5.3. How Does the Alterity of Artificial Intelligence Change the Creative Process of Musicians and, What Does that Mean on a Larger Scale?

On the other hand, for some users, utilization of Orb Composer and Orb Producer Suite software means disempowerment rather than empowerment. At the moment, musicians who agreed to try out the software and did not enjoy the process can just stop using it. However, if such software would become so popular in the future that it would become a common practice, there can be many users to whom, similar as to Mikkel and Lars’ , would not work to their liking. To be more specific, the software would create an experience that the AI does not let them express and expand their ideas but rather pushes towards accepting AI’s ideas. Because of this reason, users may feel disempowerment because of this inability to express and expand on their own ideas.

Furthermore, artificial intelligence software might also mean that now the software or the software’s designers can gain certain control over the listeners. The designers can feed whatever musical datasets they want. Because music has strong emotional power (talking about both art and music therapy), and as the listening experiment showed, even that music that was created with the assistance of Orb Composer and Orb Producer, some concerns arise. This means that those who have control of what kind of music to feed into AI, in a way has a chance to control and invoke certain emotions to the listeners. Sensitive ethical questions arise as, for example, various advertisement techniques already tend to manipulate people's emotions and behaviors a lot. What happens if AI could also be used for such endeavors, and is that ethical?

5.4. Do We Need Music That is Composed Quickly?

Even though it is evident that Orb Composer and Orb Producer Suite software can make the music production process faster, is it a possible thing when it comes to art ethics, among

other issues? When one is making music fast and that is the only goal, it can be very easy to produce music that does not have much value and especially original content.

In contrast to taking the time or (and) focusing on creative ideas and making them more "ripe" and unique, when one only focuses on producing as much content as possible no matter the quality, there is a higher risk of creating a vast amount of boring and emotionally bland music. As some insights from the Analysis part of this Thesis show, some informants and listeners experience music created with the assistance as bland and impersonal. Can this be considered as ethical from the stance of art as a valuable asset and especially as a unique human asset? It seems that from this point of view, there is still more work to do to improve or solve this issue. Otherwise, there is a danger of reaching a stage of "stagnation" at some point in terms of the evolution of musical styles. For example – as the software at this point does not seem to help to produce new styles only to repeat old ones.

Moreover, if the process becomes too reliant on artificial intelligence and it may not evolve into something more complex and somewhat more creative. Can the integration of artificial intelligence make music worse even if it is so difficult and nearly impossible to tell which music is the "better" music? There are already enormous amounts of music created and brand-new music comes out every single day, that is also very well accessible. Would it make more sense and save resources to create less music but of better quality and that tells more meaningful and unique stories? At the same time, that is an idealistic point of view and the reality of the music industry is simply as it is – fast-paced and reliant of strict deadlines. This dynamic would be very difficult to change and it is not clear if it is even needed to be changed.

Lastly, it might seem like a stretch, but creative and interesting music inspires to create more such music and to make more creative decisions and tell unique stories. That is a never-ending circle. Developers of software have to be very careful to make use of what is best from AI and not to use what can be detrimental to the creativity of musical storytelling. Human creativity is a unique, and as Gioia (2019) would point out – "magical" power that we should be careful not to reduce entirely to math's and rules because that is not everything there is to music. Do not get me wrong; I am not arguing that we should abandon the current music system and find a new one because it works in most cases and was able to help to provide with such a large amount of meaningful, emotional and creative music which was and is one of the forming forces of humanity. I simply would like to stress the importance of not forgetting to utilize human ability of exploration and "going out of the box," which might appear tempting when

incorporating artificial intelligence assistance software. Focusing too much time and economic resources too much might have negative effects on the wellbeing of both creators and listeners.

5.5. How does the Hermeneutics of Artificial Intelligence Change the Creative Process of Musicians and, What Does that Mean on a Larger Scale?

The usage of artificial intelligence in music changes people's understanding and interpretation of the world. First of all, that happens through an increased understanding of how human creativity, musical storytelling, meaning and emotional expression works. The fact that artificial intelligence assistant software can some degree recreate human creativity means that now people can understand their creative music creation processes better and to look at them from the spectators' perspective. That again gives another degree of empowerment.

At the same time, using such software as Orb Composer and Producer Suite, forms the understanding of what music is and how to express musical stories, what is meaningful and what musical elements signify what emotions. All that is due to the *rule-based* interface where the creator has to follow the classical music rules and are bound to certain mood and structural parameters that the software provides. That, on a larger scale, can both act as a way to better understand the very core of the current music system and how it works but at the same time can lead to diminishing music to something more simplistic than it actually is.

5.6. The Joy of Musical Storytelling

It is important to mention that AI could also be a useful tool to save time by putting mundane and repetitive tasks aside and leaving more space for what humans to focus on unique ideas and intuitive decisions based on exploration. This can make the creative musical storytelling process more enjoyable.

What is more, even if such music is not as unique, this creative process of a different kind of exploration and taking attention away from your own thinking can act as a meditative method to relieve stress. For example, if one is creating music not to sell but simply as shamanic meditation.

5.7. Is the Musical Artificial Intelligence Assistant Software a Bridge Towards Replacing Humans?

Even if not discussed in this paper, a very commonly mentioned and, of course, an important perspective of artificial intelligence is the discussion of whether AI will eventually replace humans. And even though This thesis investigates assistance of artificial intelligence and not artificial intelligence acting on its own, it still brings on relevant perspectives. As long as human still has to refine musical connections and structures, it is highly dependent on the composer whether this usage of artificial intelligence is positive or negative.

5.8. Engaging in the Future Developments of Music AI Software

Finally, it appears that more engagement is needed in researching artificial intelligence for musical storytelling, meaning and expression. It can be seen that even if the current evolvement of AI is impressive and exciting, the users' visions and the actual design often misalign. This pattern was visible since working on the TANT9 project. There should be more engagement to understand users' needs, even if the technical limitations of what is at the moment possible to achieve with AI technologies. This would help to potentially create technology that is more sustainable in a way that there would be higher chances of tech being suitable for users.

6. Conclusion

Music and technology have always had a powerful connection. This connection is also apparent and mediates musical storytelling, meaning and emotional expression processes. Moreover, the connection through history was not stagnant. It has changed with the involvement of both technological advancements and other factors: political, economic, *et cetera*. Many of the phenomena and issues that were apparent and important in the past did not lose prevalence and have a connection up to this day. For example, even though *math* and *rule-based* understanding of music is crucial and deeply ingrained and vital to human musical history, it carries certain controversies, as its superiority could have been influenced by other than "natural" factors. However, this understanding is the basis for working with such software as Orb Composer and Orb Producer Suite. The problem arises when not every music creator is

fond of this principle and crave for more exploitative and intuitive approaches; this, in turn, translates through the listeners' experiences.

With the fast-paced technological advancements of artificial intelligence for music creation, the mediation between a human creator, who these days often already utilizes a broad set of technological tools, introduces the need to solve new issues and rethinking the creative process and what it means. Recently the advancements in artificial intelligence for music creation are impressive. In the industry, there are several types of artificial intelligence software and the results that can be achieved using such software are remarkable. Artificial intelligence music creation assistant software Orb Composer and Orb Producer suite, even though as seen from the Analysis of the empirical data collected, has its flaws and weaknesses, can assist music creators.

Looking through Post-Phenomenological lenses, this assistance mediates through eight perspectives: (1) sound and mediation of musical storytelling, meaning and emotions, (2) mediation of listener’s experience, (3) musical ideas and assistance of artificial intelligence, (4) intuitive and rule-based creativity, (5) machine as a creative partner, (6) creative decision making, (7) mediation of inspiration and (8) hermeneutics of usage of musical artificial intelligence software.

Finally, artificial intelligence software Orb Composer and Orb Producer in some ways can assist musical storytelling, meaning and emotional expression processes and is an exciting and a welcome development to many. However, at the same time, it possesses dangers, concerns (as it can both give and take away power) and misaligns with the users' expectations.

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