Jamming with Machines
Social Technologies in Musical Creativity

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ABSTRACT

In contemporary music production, machines are an integral part of creativity. This is not only true for the obvious cases of electronic music, but also for classical music recorded on digital systems or electro-acoustic rock music utilizing software for core aspects of sound manipulation. The philosopher Gotthard Günther has pointed out that traditional views on technology tend to devalue the use of machines versus social interaction in creative processes because of a loss of "spirituality". But what do they mean by this "spirituality"? After all, utilization of machines in creative processes does not usually correlate directly with the grade of "spirituality" attributed to their outcomes. And what are musicians' views on their creative processes? Do they see "spirituality" outside of social interaction? And what would Gotthard Günther have to say about the heavy use of machines in music production?

Creativity is a social process. This is obvious when musicians work together in an orchestra or a band, negotiating their parts and structuring their performances. It may seem less plausible for artists working individually, especially lone geniuses like Mozart or Aphex Twin. When describing the creative process of such artists, usually the aspects of composition move to the foreground and are understood as individual actions where the creative subject establishes itself. Contrary to that notion, the paper argues that even the most subjective creative process of a lone genius is indeed a social endeavor, and that investigating it using methodologies of cultural sociology will facilitate a deeper understanding of what it means to be creative. All of this is done with the perspective and intention to support creative processes by designing and developing technologies that can break the barrier of individualism and help to leverage some of the power of distributed, social creativity. We start off with a basic question: How do musicians work together? Music collaboration is usually interactive, in a situation of mutual observation, with sequences of expressions and reactions, as described in studies on improvisation techniques. The

strength of the social in this process is the ability of the human participants to observe and discuss the music at hand from their cultural backgrounds, evaluating and predicting how it might be received in their cultural publics. All participants are members of society, feeding their observations made in the creative process back into the social system, from their respective positions. This is also true for the lone geniuses, who observe themselves, possibly from different positions, against their background of cultural knowledge and values. On the other hand, interacting with machines is usually a less social endeavor, at least at first sight. Either the machine just provides an expression, without relation to the social context, or the machine observes the context somehow, and provides an expression it deems fitting. However, machines so far do not offer cultural understanding beyond what is already embedded into their construction. They follow a more or less traditional approach of individualism, aiming to become "mechanical brains". How, then, can we broaden the cultural perspectives of the machines we use in creative processes? Which aspects of creativity can benefit from enhanced sensitivity towards socio-cultural contexts? The paper explores these questions by providing scenarios and investigating recent developments in the relation between social and technological aspects of creativity in music.

Author Keywords

Music, technology, creativity.

INTRODUCTION

In the year 2004, the artist Tom Jenkinson, well-known as Squarepusher, published an article titled "Collaborating With Machines" [9]. Although this article only has three pages, it provides a seminal assessment of the state of arts dealing with current technology. The picture he paints is bleak, but not at all pessimistic. He takes a rather radical perspective and describes the motivation to create and be an artist as an attempt to encode oneself in the work, and thereby hide away from the looming endless void of death by creating an ambassador that remains. This results in the paradox situation that artists create in order to hide, maybe from themselves, yet at the same time aspire discovery in society to achieve that very goal. Clearly, artists then have to express their own will in their works, as otherwise these artifacts would not carry anything belonging to the artist to potential immortality. This notion of the work of art as

maybe the purest manifestation of an individual's will is put into question by Jenkinson, especially for the case of electronic music. If all of electronic music is by definition dependent on the technological abilities of the machines used by the artists, then how do we have to view and assess their role? Do they express something akin to a will in the resulting artifact? Jenkinson does not go that far; he rather sees the danger that artists try to forcefully subvert the machines to their will, thus actually hindering what could otherwise be a fruitful creative collaboration.

Is this view too anthropomorphic? Can we follow Jenkinson in calling the use of machines in music production a mode of collaboration? The philosopher and mathematician Gotthard Günther has analyzed the traditional claim that technology rids art of a so-called "spirituality" in his paper "Cognition and Volition" [8] and his book "Das Bewusstsein der Maschinen" [6] (engl. The Consciousness of Machines). For Günther, a will as the act of volition is nothing separate from cognition, in the sense that a will as an expression of subjectivity could be forced onto an indifferent environment of objects, which is grasped by unimpressed, i.e. objective cognition. Rather, Günther argues, both have to be seen as part of the same process, a process that integrates cognition and volition in different exchange relations, where order and disorder are transferred between elements participating in the relation. This approach, combined with the deep tools for analysis he proposes, makes Günther's theory a powerful instrument for research into human collaboration. Applied to electronic music, this would mean that machines can contribute order by creating and reliably maintaining a certain set of sounds, and by allowing their users to arrange them in time. On the other hand, machines rely on artists to be constructed in the first place, and then to channel their output into artifacts such as vinyl records or singles on Beatport or iTunes. This cultural ordering remains, for the time being, the domain of the artists who effectively act as social addresses for artifacts created with machines. At the same time, machines are also conceptualized and constructed in social processes. With Dirk Baecker [3], any product can be described as an objectification of the social capabilities incorporated within the organization that created it. In the case of music machines, this objectification is in no small part informed by the perceived needs – again a notion of volition – of the artists who are supposed to buy it. Thus, a primordial exchange of order manifests itself in the construction of what may later be – rightfully or not – perceived as volition once the relation between machine and artist is established.

SOCIALITY IN THE CREATIVE PROCESS

The relation described so far does not yet do justice to the complexity observable in instances of artistic creativity. Research on creativity [10, 15] suggests that contrary to traditional views, creativity is not an expression of an individual, but rather always a case of social collaboration. Keith Sawyer has coined the term "Invisible Collaboration"

for situations where the mode of working together towards a creative output does not become observable to the public [15]. With this and other research, the notion of the lone genius is in the process of being classified as a myth for both arts and sciences. Almost all inventions or expressions can be attributed to sociocultural sampling and discourse upon detailed examination. What does this mean for our consideration of expressions by artists and machines?

Currently ongoing research in the project "GiantSteps" (www.giantsteps-project.eu) suggests that we may have to rethink our notion of machines as individualistic devices which generate their output on the basis of the input of the individual artist-user. Instead, we see an image emerging where artists have to justify most if not all their critical steps socially, against a cultural backdrop of having to fit in with the aesthetics dictated by certain genres and styles [13: pp. 118]. In many areas of electronic music, the audiences are composed of listeners with a profound knowledge of the technologies used in the creative process [5: pp. 36]. Thus, even if artists choose to create on their own, they are never really alone with their instruments, at least not when creating anything for a public release. Expectations towards reception and reaction among the audiences are present, and as Niklas Luhmann [13: p. 79] has pointed out, artists effectively act as their own primary audiences, judging every part of their creations against their own expectations towards what fits in with the relevant cultural contexts. This influences every step in the process, not least the interaction with machines. The choice of machines to use, and how to use them, is part of the creative process, and it often becomes visible to the audience. This is nothing new in the field of music technology, where e.g. guitars and violins have a history of playing a role as social markers and contributing to their users' identities. However, guitars hold much less internal complexity than today's machines used in electronic music. With these new machines, artists can tap into large collections of cultural data, and in doing so, they add to them every time they use them.
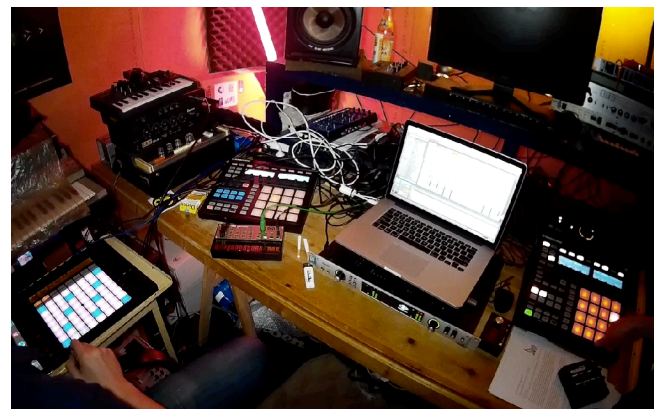

Figure 1. Ad-hoc studio setup in an explorative recording situation.

REDUNDANCY AND VARIATION

Consider the following example: Imagine you want to produce a piece of pop music. Where do you start? Usually, there will be either a melody or a chord progression, or most commonly in my area of research, a rhythmic pattern. None of these are invented from scratch, but rather the chances are high that you repeat something you have heard many times before, in your personal canon of popular music that has influenced you over the years. Much of popular music comes from this paradigm of starting out by imitation, but then changing the material and adding variations that turn the music into something else, something that can stand as a new, original piece of its own. So you will likely start by collaging together a sketch of a piece, its structural framework. To achieve this, however, you require some knowledge in the form of an ability to play an instrument that is fit to act as an input device for the technological framework you are using – and this can include the computer mouse. After this structural framework is available, you will likely start to work on the more original parts, mainly the sound and the breaks in the framework. You will listen to the piece in its parts and its entirety many hundred times, evaluating it against the background of cultural expectations which you assume will play a role when the piece is perceived by a wider audience, making adjustments here and there to make it a better match. After all this is done, you will publish the piece under your real or your artist name.

In which part of this process do you see the main creative act? Where is the "spirituality" Gotthard Günther mentioned? Is the selection of a structural framework from fragments of your cultural background something creative, or is it rather similar to a scientist collecting literature for a state-of-the-art in a new paper? If machines were able to do this basic work for you, and provide you with proposals for ready-made structural frameworks of a piece of music that fits your cultural background, wouldn't you embrace the possibility to save time and be more productive? Our ongoing research in the GiantSteps project suggests that this is not necessarily the case. Some of our interviewees, all artists with a strong focus on beat-centric music production, state that they would rather not use a recommendation system that provides them with a ready-made structural framework for new pieces, or with rhythmic parts to be used in their compositions. Others would be interested to try out such structural proposals, but were against applying something similar to their selection of sounds. There appears to be a strong sentiment against the idea of a machine constructing the entire groundwork of a piece of music. At first sight, this seems illogical when considering the greater realm of cultural practice, where the repetition of established patterns or sounds would appear as redundancy. But this misses the point of the perceived individualistic usage of these music machines, which Jenkinson portrayed as the illusion that machines can be subverted to an artist's will. Here, redundancy in the form of repetition of established cultural

patterns serves an important function for the artists themselves, by acting as a self-affirmation that one does indeed fit into the cultural frame one envisioned for the piece about to be produced. Thus, the basic manual task of repeating a rhythm or a chord progression that has been used in popular music many, many times is seen as an important part contributing to an artist's self image, and machines used in music production are expected to support this task.

The cultural abilities of machines also have to be reconsidered when it comes to taking what the user produced and suggesting variations, both in structure and in sound. Machines operating in this direction follow a long history of music technology that takes musical expressions as input and modifies them according to its internal states. Analog modular synthesizers have become famous for this ability, and complex electronic music systems have taken it to extremes of abstraction, for example with the live processing of orchestral sounds found in Jonathan Harvey's works [16] or the live effects systems used by Robert Fripp [14]. The new music machines we see on the horizon today expand on this in two ways: First, they are able to directly change the structure of a piece, and second, they can adapt to the cultural context as they detect it – provided they have enough data on it. Data is key in this development, as the algorithms at the heart of it do not need any semantic description of a genre or style in order to produce patterns that fit into it, nor do they need to know a comprehensive set of rules for doing so. Instead, they go by multidimensional similarity vectors, in essence producing results that are always somehow similar, yet different.[1] However, the urge to be in control of the initial state of the setup is even more comprehensive. When jamming with machines, the choice of machines appears to be crucial, sometimes determining the direction a music session can take. Moreover, these machines are expected to behave as trivial machines at least at the outset, i.e. they are expected to behave exactly the same every time they are turned on. Context-awareness could contradict this expectation if machines were to exhibit a different set of parameters or an otherwise different configuration of their internal algorithms depending on the genre context or the type of session they detect around themselves. Essentially, contingency on the part of the machine at the outset of a human-computer interaction seems to be viewed as counterproductive. In music sessions, the artists seem to be keen to define the cultural situation themselves,

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[1] So-called deep learning algorithms, which constitute a large share of the current state-of-the-art applications in context-aware machines, do not rely on pre-defined concepts of possible contexts, in this case, musical genres and styles. They generate their own internal representations of the situations they encounter, be it in realtime or in existing data sets. These representations are usually not compatible with social semantics of cultural descriptions, i.e. they are not human-readable [11].

including the style and genre details. A dedicated feature set in a machine that is advertised to detect the genre and style of its musical context can be seen as limited, in the sense that it does not offer its full capabilities to the user, but rather restricts itself and its user to a subset it deems fitting the cultural context.

Figure 2. Carefully prepared live setup during rehearsal.

CONCLUSION AND OUTLOOK

Artists generate, store, and manipulate sounds and their arrangements in machines. In collaborations, the interfaces between the participating artists are defined on the basis of technological protocols, and when they want to publish an artifact, the feature to do so is often already built into the machines as well. The cultural knowledge of the artists is thus sampled and stored by the machines, where it is added to the data collection and ready for further use. Machines absorb and reflect the aesthetic choices made by the artists, and as they associate themselves with any artifact that gets published, they are also invested in the results. This reflection should not be confused with reflection known from the human mind. Rather, returning to Gotthard Günther, we see a third kind of reflexivity: After the unitary choices in God or in nature have been reflected and met with potential negation in the human mind, Günther argues that a third kind of reflection – and negation – meets the choices made by the human mind in the internal processes of machines [6]. As they increase their capacity to deal with more and more complex processes, they will be able to reflect more and more parts of human participation in social processes. For music creativity, we see not the substitution of human collaborators by machines, but rather the frameworks becoming context- or rather culture-sensitive, and thereby more relevant in the artistic production process. Artists retain their position, partly as operators of their machines, as Tom Jenkinson reported, but partly and increasingly as social anchors in cultural realms that are heavily based and relying on technological frameworks maintained by machines.

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