1 Improvisation Here, There, and Everywhere

When talking of improvisation, we often refer to a marginal aspect of improvisatory practices. The common view of improvisation relates to the image of a performer who starts playing, singing, dancing, or acting without following any pre-determined set of instructions. Although this is a way in which improvisatory practices may be delivered, so-called “free improvisation,” in almost every tradition and in every art form there are more or less explicit improvisatory practices. In addition to performative arts, improvisation permeates also art forms such as painting and photography as well as non-art activities. A child that tells an intricate and outlandish lie to disguise her misdeeds is, indeed, improvising.

From this pervasiveness of improvisatory practices comes the necessity to give an account of the nature of improvisation which accommodates cases that lie also outside fields such as jazz or improvisational comedy which are more traditionally associated with it.1 This need is even more compelling in the present day, given the emergence of new forms of art, including some that originate from the co-improvisation of humans with machines.

The main aim of this chapter is to counter the traditional ontological paradigm that sees work and performance as distinct entities, adopting instead improvisation as a model for the interrelationship between composition and performance. I will address how an independently motivated ontological theory, Musical Stage Theory (MST), can account for improvisation within its ontological framework, by shifting the focus from the product to the process and describing improvisation as a creative process that pervades many artistic activities. In the second part of the chapter, I present contemporary examples of the centrality of the performative dimension of artworks, describing improvisatory practices in art forms that emerge from the collaboration between humans and technology. As a byproduct of this discussion, I will argue how an analysis of improvisation in human-machine collaboration in the arts can help us also answer questions regarding creativity.

The focus of most of the arguments and examples in the following sections will be on music. This is due to the fact that the ontological account that the definition of the nature of improvisation is based on, i.e. MST, is, as the name suggests, a theory on the ontology of musical works. Nevertheless, this does not exclude the possibility of extending the considerations here developed to other art forms and to improvisatory practices in general.
2 Many Improvisations

Despite the persistent presence of improvisatory practices in the performing arts and in other human activities, improvisation has been neglected by musicology until recently (Gould and Keaton 2000: 143). Even if improvisatory traditions continued to be present in various forms throughout all the history of music, it was only in the 20th century that improvisation saw a resurgence in musicological and ontological studies and this was mainly due to the role it played in jazz.2

The difficulty of including improvisation in an ontological analysis is due to the fact that the ontologies of art normally focus on the final product rather than on the process and they target unchanging and well-structured objects that can be readily labeled as works. Instead, improvisations are not well-rounded objects like paintings or sculptures.

The polysemous meaning of the term “improvisation” does not help achieve a clear-cut definition of the notion, either. Indeed, improvisation can be described both as a product and as a process. In a stage play of the Italian Commedia dell’Arte, for example, improvisation can be identified through the play itself, namely the final product, or through the actors’ performance, i.e. a process.3

An even stronger factor of confusion when it comes to defining the nature of improvisation comes from the weak boundary existing between the notions of composition, performance, and improvisation.

We are used to associating the idea of improvisatory musical practices with the image of a performer who starts playing her instrument without any score but instead following her own idea of how she should go on and play. However, the two processes of improvisation and composition have many traits in common. Indeed, many elements that characterize the act of composition are present also in the act of improvisation, although there is not a perfect overlap between the two processes.4

In music, the reason that determined the interpretation of the acts of composition and improvisation as two detached and extraneous activities is an historical one. Before the 19th century, the score was conceived by both composers and performers as a sketch on which the composer notated a basic recipe for how the piece should sound. This sketch then needed an interpretative intervention on the part of the performer, whose active role was a necessary requirement in order for the work to be complete. There are various reasons that stand behind the increase in details present on musical notation– e.g. the origin of professional orchestras, the institutionalization of musical works as commodities, the increased geographical mobility of musicians, the rise of a new market of amateur musicians – and they concur with the significant changes that musical scores underwent during the 18th and 19th centuries (Goehr 1992: 224–34).

In the mid-1900s, improvisation started to be gradually reintegrated within composition; for instance, in some kinds of graphic notation in John Cage or Earle Brown’s compositions, where the performer is provided with unusual suggestions, such as drawings, which she must interpret (Bailey 1992: 60). Even without considering extreme cases like these, though, a certain amount of improvisation is present in every translation of a score into sounds. Despite the efforts of composers, in fact, the notation of the score was and remained underdetermined. A score needs to be interpreted by performers and this interpretation certainly has aspects of improvisation in it.5

Every time a musician performs a piece, in fact, she will make slightly different choices in regard to many aspects of it and often these choices are made on the spot, according to the mental and physical situation of the performer herself and in like with the inputs that she receives from the audience.6 The acknowledgement of the influence of improvisatory practices on every rendition of a musical score into sounds is the first step towards the deconstruction of the idea of composition, performance, and improvisation as extraneous fields. As I will show in the second part of this chapter, the ever-growing use of technology in the creative sector is making this boundary even blurrier (Bertinetto 2016: 63).
It may be more beneficial to interpret the relation between improvisation and composition as a matter of degree. At one end of the spectrum we can place a free improvisation that does not exploit patterns on which to elaborate. At the other end, we have the composer sitting at her desk and thinking about the structure of her composition.

The literature that addresses the nature of improvisation reflects the difficulty of tracing the boundaries of this notion. Ontologies of art have the tendency of confining the objects of their enquiry to recognizable limits that can help them in framing their nature. This widespread tendency is one of the reasons for the obstacles that theorists find in describing the nature of improvisations. In the next sections, I will account for the struggles encountered by some of the main theories and, ultimately, I will suggest how all these difficulties may be avoided by dismissing ontologies that adopt as a paradigm of work the product, and by proposing, instead, an ontology that places at its core the process of artistic production.

3 Ontology of Improvisation: A Quick Excursus

Improvisation has kept many scholars busy trying to define its nature and to include it within an ontology of art. Due to its hybrid and ephemeral nature, however, the task has proven to be difficult to accomplish. Improvisations, in fact, do not have a fixed and prescribed set of instructions, like written works of music, poetry, or ballet dance steps. Neither are they amenable to the dualistic distinction between work and performance. In improvisation, work and performance coincide in the spontaneous act of the performer.

Before the performer improvised, that sequence of sounds, words, or steps may have existed, but it would never have been performed in that particular way. It will never be performed in precisely this way again, at least, without giving away its status as an improvisation. Improvisations can indeed be used as models for subsequent performances. However, the performances deriving from an initial improvisation cannot be deemed improvisations themselves. The relationship between the original improvisation and the possible instantiations that take it as a model, therefore, is not, strictly speaking, a repeatability relationship, as the concept of repeatability has traditionally been interpreted. In particular, theorists that prescribe a type-token distinction struggle to include improvisations within their theory.

The type-token model is one of the most widely accepted models in the ontology of art. Type-token theories are characterized by the distinction between an abstract entity, the type, which is instantiated multiple times by concrete entities, or tokens. For example, a musical work is an abstract type that is repeatable thanks to its instantiation in multiple concrete performances, or tokens (Dodd 2007). From this duality – "abstract versus concrete," "single versus multiple," – a first difficulty emerges. Indeed, admitting the possibility of several occurrences of a type would conflict with the nature of improvisation as a unique act. Therefore, type-token accounts have been deemed unsuitable for accounting for improvisations.

A typical strategy for the type-token theorist is, following Philip Alperson (1984: 26) and Peter Kivy (2004: 99 ff.), to interpret an improvisation as a unique token of a type. For the type-token theorist, having only one token of a type is not particularly worrying. After all, there are many compositions that were performed just once. What differs in the case of improvisations, however, is that while in the case of an unperformed score, or of a score performed only once, there is nothing negating the possibility of it being repeated, improvisations are – by their very nature – unrepeatable.

In a similar way, theories that describe musical works as classes or fusions of performances, e.g. Musical Perdurantism, also struggle to include improvisations within their ontological frameworks. Indeed, they can account for improvisations only by allowing these classes to have just one element (Caplan and Matheson 2006). Theories that assign to the score, or more generally to the
set of instructions, an essential role for the identity of works, like Nelson Goodman’s (Goodman 1968), would struggle even more, given the fact that there is no set of instructions against which the correctness of a performance can be compared. As a result, the impossibility for an improvisation to be repeatable and its ephemeral nature lead many scholars to the conclusion that improvisations cannot be deemed “works.”

Indeed, not everyone is willing to give improvisations the status of “works,” preferring instead to highlight their transitory identity and focusing on the peculiar aspects of improvisation that distinguish it from other phenomena, instead of trying to make it fit within the paradigm of “work” at all costs.

A feature of improvisation that is highlighted by many as its distinctive aspect is spontaneity. Philip Alperson defines improvisation as a “spontaneous kind of music-making” (Alperson 1984: 20) while Alessandro Bertinetto describes it as a “process that unfolds while being created and attended to, an intentional production of sounds (and silences) ‘on the spur of the moment,’ that does not follow pre-established instructions for performance” (Bertinetto 2012b: 106). Other theorists, however, do not agree with the attribution of spontaneity to improvisation. While it is true that some improvised performances are completely spontaneous, most of them are based on a pre-determined pattern: “The guidelines can be quite loose and can provide musicians with a great deal of scope. […] Nevertheless, the performer who opts to follow the guidelines is under some constraints” (Young and Matheson 2000: 129).

From this quick overview of some of the main accounts on the nature of improvisation, it is easy to see how a consensus on the topic is far from being established. Indeed, theories such as the type/token, the perdurantist, or the nominalist one cannot include improvisations within their ontological framework without making some ad hoc adjustments. For their part, instead, other scholars do not justify their description of improvisation through a specific ontological theory.

Compensating for this absence is what I propose to do with the account of improvisation that I suggest in the next section. As I will explain, MST reshapes the discussion on the ontology of musical works, accounting for artistic practices and shifting the focus to the process of performing. Thus doing, improvisation becomes an exemplar for works of music and it can, by all means, occupy a place of honor in the ontological structure offered by this theory.

4 Musical Stage Theory as an Ontology of Improvisation

Generally, most of the problems concerning the definition of improvisation result from a desire to describe it in terms of a repeatable entity which fits into the paradigm of more traditional kinds of works. If this aim disappears, then other problems disappear and, as a result, it is still possible to analyze improvisations within an ontology of artworks and, more precisely, within an ontology of musical works: MST.

MST challenges the traditional concept of musical work and gives prominence to the sonic/performative dimension, with the aim of recognizing the relevance of the performer’s role in the nature of works. The revisionary thesis of MST disrupts the division existing between performance, composition, and work. Indeed, the central claim of MST is that a musical work is a performance (referred to as “work-as-performance”) and the nature of the work is explicated in its sonic-performative aspect. As a consequence, strictly speaking, every performance is a different work. One of the consequences identifying musical works with performances is that they cannot be repeatable, if, for repeatability, we adopt the traditional meaning of having multiple instantiations. Indeed, the ontological nature of the work-as-performance consists in an event that occurs in the immediateness of the present and, thus, cannot be repeated.

Yet, MST needs to somehow mitigate its revisionary stance to acknowledge that the act of grouping performances together according to a certain relationship also plays a role in our
discussions about music (Moruzzi 2019: 417). Every performance is, thus, described as being related to its counterparts through the repeatability-relation: “a privileged ‘horizontal’ relation between different entities explains what is commonly understood as repeatability, that is a ‘vertical’ relation between a work-type and its exemplars” (Moruzzi 2018a: 344). Through this strategy, then, MST can explain how our linguistic attitudes shift between the reference to works-as-performances, to a more general concept of work – what is called the “work-as-construct.” For example, when I say, “I am listening to Brahms’ *Fourth Symphony,*” I am referring to a work-as-performance – what for MST is, strictly speaking, the work. If instead I say, “Brahms’ *Fourth Symphony* has been performed many times in this concert hall,” I am referring to a collection of performances, related through a repeatability-relation, which are part of the work-as-construct.18

The revisionary nature of the claim given by MST that musical works should be identified as performances arises in contradistinction to the idea of “work” transmitted by the Classical tradition that we most commonly have in mind when thinking about music.19 Still, if we acknowledge the relevance of improvisatory practices and of other practices of elaboration of the score, the identification of what we call “work” with the single rendition given by performers would not sound as counterintuitive as it may seem. On the other hand, with its focus on the delivery of the piece instead of the process of its composition and its undermining of the traditional work-like concept, MST is able to account for the flexibility applied to music throughout its history and also to grant the necessary relevance to the role played by performers and by their improvisations.

As discussed in previous sections, the impossibility of being instantiated more than once was one of the concerns that prevented other theories from accounting for improvisations. MST does not have this problem. Within its framework, improvisations can be deemed musical works as much as other performances. Indeed, for the ontological account offered by MST, at the level of the work-as-performance there is no distinction between improvisations and performances of pre-written compositions. Contrary to aesthetic empiricism, for MST the cultural context and the history of production are not part of the ontological nature of the work. Thus, an improvisation and a live performance are not distinguishable by their different history of production. The ontological nature of the work/performance is in its *hic et nunc* essence, immediately graspable by a potential audience, and not in the history of production or in the sound structure. Therefore, it is not repeatable. What is needed for something to be counted as a work, or, more precisely, as a work-as-performance, is that it is a sonic product, intentionally created and performed, and which is immediately graspable by a potential audience (Moruzzi 2018a: 342). In their immediateness, improvisations are musical works *par excellence.*

Following the ontology offered by MST thus, we can define improvisations as works-as-performances, as one-off events the nature of which is not dependent on the relation that they bear to other performances or sets of instructions. They share the essential traits of their ontological nature with that of performances, where with “performances” we mean not merely musical performances but events that share most of the features that characterize accomplishments: performances occur in time, have a goal, have temporal boundaries, can be complete or incomplete, and can be done quickly or slowly (Vendler 1957; Kenny 1963).

The focus that MST places on musical works does not prevent us from applying the tools that it offers to the analysis of other art forms. The identification of the work with the performance can be easily adapted to all performative arts, as well as to every activity that incorporates improvisatory practices. The ontology of MST allows to consider each process in isolation (be it a musical, theatrical, or dance performance, as well as a painting, sculpting, writing, or photographing one) and to recognize it as a “work-as-performance.” As a process, improvisations can of course also be interpreted as such and their status is no more inferior than that of more traditional and prefixed forms of art.

Improvisations are paradigmatic of the shift of focus operated by MST from the product to the process. Specifically, improvisations are creative processes, because their creation calls for a
creative endeavor on the part of the performer, who extemporaneously needs to make decisions in respect to their temporal and sonic structure (Canonne 2018: 11).

In the next section I will argue in favor of the relevance of shifting the focus onto the process when considering the ontology of art, presenting art forms of human-AI interaction where the performative process of improvisation constitutes the core of their essence. The creative aspects of improvisations, displayed in the interaction between humans and machines in these forms of improvisation that I will present, may provide us with the means to better understand where this creativity lies and how it presents itself.

5 Improvisation and Creativity in Human-Machine Interaction

The increasingly common use of Artificial Intelligence (AI) for the generation of content has brought it closer to areas of application that, until not so long ago, were considered the prerogative of humans. Artists have been using AI to create art since the 1960s (the program AARON by Harold Cohen is just one of the most famous examples) but it is only recently that artworks created by AI have gained the attention of the general public.20

In the musical sector, David Cope’s Experiments in Musical Intelligence raised a lot of interest in the 1990s, together with a lot of harsh criticism. And, more recently, there has been an increase in the number of software for music composition: AIVA technologies, Google Magenta, and Sony’s Flow Machines are the major players in a basin full of start-ups and smaller companies.

I defined the creative sector as an area that is traditionally conceived to be paradigmatically human, in part because humans seem to be the only animals that engage with the arts and take pleasure from this activity, and in part because it requires some abilities that machines seem to presently lack.21 There is a rich literature on the topic of creativity and its definition. A consensus on what creativity is has not been reached, though. Instead, scholars propose a number of different properties that they present as necessary for creativity: novelty (Amabile 1996; Guilford 1950; Simonton 2008), originality (Runco 1988; Bridy 2012), value (Boden 2004), autonomy (Moruzzi 2018b), and others. The difficulty in finding a single definition of creativity that everybody can agree on is motivated by the fact that the notion of creativity can be interpreted in different ways: as a subjective or as an objective property (Dewey 1934; Newell et al. 1962; Nanay 2014), as the property of a product or of a process (Elton 1995; Nanay 2014), as a property that can be explained computationally (Simon 1985), or as something that cannot be defined (Minsky 1982).

With respect to the last one, it is easy to see how the difficulty that already exists in defining creativity cannot but increase when analyzing not human but machine creativity. On the one hand, there are theorists who support the possibility of AI being creative (Newell et al. 1962; Simon 1985) but, on the other hand, there are detractors or people who are hesitant to acknowledge this possibility (Amabile 1996; Kelly 2019).

As I claimed in the previous sections, I deem improvisation a significant mark of creativity. Indeed, in improvisatory practices we find many elements that are traditionally recognized as constituents of creativity. I already mentioned how spontaneity is considered by many a distinctive aspect of improvisation – it is a facet common also to creative processes.22 In addition, improvisation displays many of the features that have been associated above with creativity, e.g., originality, surprise, and value, and it shares with creativity a considerable semantic richness.23 Even more importantly, improvisation focuses on the process that is undertaken by the artists, and not on the final product. The consideration of the process rather than the product is a key factor in avoiding biases and misconceptions when evaluating creativity, especially in respect to machines (Boden 2010; Moruzzi 2018b).

I argue that an evaluation of improvisation can be a useful undertaking in order to better consider whether a process is creative, since it is easier to assess whether a system can improvise than to assess its creativity (Sawyer 2000a: 150). This is even more relevant in the case of artificial
creativity, which, as mentioned, is still a contentious and scarcely explored topic. If a machine is deemed to be able to improvise, then, I argue that we may have grounds for regarding it as creative.

In the next sections, I examine two examples in new and different areas of art in order to consider how humans and machines interact through improvisatory practices. The scope of these examples is to show both the pervasiveness of improvisation, highlighting new aspects of it that emerge from human-machine interactions, and how the focus in these art forms shifts – even more considerably than in more established art forms – from the product to the process.

6 Against the Composition-Improvisation Boundary: Live-Coding

Musical live coding is a form of musical performance that involves the real-time writing of source-code to create sound. Thor Magnusson, an expert in the field of music composition through digital media, describes live coding as an extension of the traditional musical score and as a real-time improvised composition (Magnusson 2011: 19 ff.). Indeed, improvisation is integral to live coding, as the latter is, by its own nature, an on-the-fly and spontaneous composition of sounds (Krekovič 2019: 7). During a live coding performance, the performer/composer writes and edits code on a system called the “interpreter,” using a PC or laptop as a musical instrument. Most of the time the code is projected on a wall so that the audience can follow the composing process of the artist.

A live coding performance requires the performer to make decisions on the spot as to how the musical piece will develop. The live coder can indeed evaluate and edit the code while the music is playing, thus changing the direction of the piece through the constant feedback that she gets from the sounds produced by the code (Goldman 2019: 284). The distance between composition, performance, and improvisation becomes then almost indiscernible: “The novelty of live coding is not simply that composition has become a real-time activity but also that the compositional tool is brought forth to the degree that it is seen as a musical composition in and of itself” (Magnusson 2011: 22).

Just as in more traditional performances, though, in live coding as well improvisation can be of different forms. “Free-improvisation” can take place if the artist does not rely on pre-determined patterns of code and instead just follows the inspiration of the moment. At the opposite extreme, we can also listen to a performance where the code has already been entirely written and, thus, where the live-coder just performs what was prepared earlier. In this case, the gap between composition, performance, and improvisation broadens and the live-coding performance assumes the traits of a performance of a pre-determined score. In between these two extremes we find what is maybe the most common form of live coding – namely, the one in which the live coder prepares in advance only patterns or short sections of code that she uses as inspiration and upon which she improvises on the spot (Krekovič 2019: 7 f.). This is indeed also the method that is most often adopted in improvisation in other musical genres, like jazz.

Although live coding as a form of music making is relatively new – the first instances date back to two decades ago – varied are the techniques and methods that have already been developed to enrich the improvisational experience of the performer and, thus, to intensify the creative potential of this system (Krekovič 2019). Manifold are also the interrogatives and issues that the practice of live coding is raising from a musicological and philosophical perspective. For instance, compelling is the question of the relation between the coder and her instrument in terms of embodiment. In the literature, many are the works that consider the role of embodiment not only in the perception of music but also in the relationship that is formed between the performer and her instrument (Corness 2008; Leman and Maes 2014). In the case of live coding, the instrument is a keyboard (as hardware) and a code interpreter (as software). It can be argued that the manipulation of the sounds that the live coder can perform is much more disembodied in respect to the control that a performer can have on an “analogic” instrument (Goldman 2019).
More relevant for the discussion in this chapter are the reflections on the pervasiveness of improvisation in new art forms and on the weak boundary between composition, performance, and improvisation that emerge from the investigation of the phenomenon of live coding. In a sense, live coding exemplifies the strong link that exists between composition and performance. In addition, it restores, in part, the role that performers had in the past in the Western tradition and still have in other musical traditions: not just as someone who slavishly executes what has been written by others but as a composer in all respects, who masters the art of producing and shaping new sound structures on the go.

Live coding is an example of how the experimentation with new methods of improvisation and interaction between humans and technology can open up new paths towards forms of creativity heretofore unknown (Sawyer 2000a; Dudas 2010). Technology, in this sense, is breaking boundaries, both in respect to the composition/performance dichotomy and in respect to the possibility of humans and machines creatively interacting. And while it can be argued that the interaction between human and machine in live coding is relatively weak, since the computer is mostly used as an instrument rather than as a collaborator in possession of its own agency, other research done in the field of music improvisation shows how a deeper level of collaboration is possible.24

The next example explores precisely how deep this collaboration can go, with the aim of extending the results of this investigation outside the art world to the everyday interaction that we can have with machines and other forms of intelligence.

7 Improvised Paintings: Sougwen Chung

Improvisation is more often associated with performative arts such as music, theatre, or dance. However, improvisatory practices can be found also in other kinds of arts (Bresnahan 2015: 575; McCormack and D’Inverno 2016: 103). The example that I discuss in this section shows how improvisation can be an essential component in the process of drawing and painting. In particular, the improvisatory process in question involves collaboration between humans and technology. The human that makes this possible is the artist and researcher Sougwen Chung.25

In her work, Chung, a former researcher at MIT’s Media Lab and current artist-in-residence at Bell Labs, explores the dynamics of interactions between humans and artificial systems through real-time, improvised drawing performances. These performances, showcased all around the world, exhibit an improvised co-creation that produces a drawing artifact as the final product.

An example of her work is the ongoing series of Drawing Operations that started in 2014. This project is a speculation on artificial creativity and on the mimicry and memory of the robotic arm that collaborates with Chung in creating the drawing. The movements of the robotic arm are generated by neural nets that are trained on Chung’s gestures and previous drawings, as well as on images coming from historical archives and contemporary artists.26 The mimicry of Chung’s movements happens during the performances in real-time and the co-creation between the human and the robot develops on the go, in an improvisatory fashion. The context and the behaviors that emerge from this performance are a crucial element of the collaborative process and of the end product:

The robot mimics the artist like a partner in improvisational round singing performance. It is an AI that embraces every glitch, bug, and error. The drawing session, without pre-established harmony, frees itself from aesthetic constraints, while also examining the essence and phenomenon of beauty at the same time.27

Technology becomes an instrument by which improvisation is included in art forms where, instead, the focus has traditionally been on the final product rather than on the process of creation.
As in the case of live coding, the example of Chung’s work shows how the employment of artificial systems for creative endeavors is changing the traditional nature of art forms and how improvisation plays a key role in this transformation. Chung explicitly regards co-creation as a way of understanding AI and of exploring the possible modes of interaction between humans and AI. The “creative partnership” that Chung conceives and initiates allows us not only to explore human-robot interaction but also to reframe the “conventional narrative assigned to artificial intelligence.” This is essential for the historical moment that we are living in, one characterized by an increased pervasiveness of technology which, as a consequence, is giving rise to biased and typified interpretations of the role of technology and of our relationship to it, which are not always correct nor beneficial.

The risks of not having a beneficial relationship with AI may derive from two opposite phenomena: (i) the over-hyping of AI that sets too high expectations on what it may achieve, which can then be easily let down and (ii) the negative biases against AI that may lead us to dismiss every kind of its achievements, even the ones that may be interesting and/or beneficial. To this it should be added that it is necessary, in order to achieve an optimal relationship with AI, to achieve a sufficient amount of understanding. This understanding should come from both directions: AI needs to develop its capacity of understanding humans but humans also need to better understand AI. Research studies such as the one conducted by Chung can help us increase our level of understanding of AI. By analyzing art production from AI we could in fact better understand how AI interprets and interacts with human actions and how it elaborates and actuates the concept of producing art. Again, creativity comes to the fore here: considering whether and how AI can be creative could give us a deeper level of insight in respect to the underlying mechanisms that motivate the machine’s actions.

In the case of the artistic partnership resulting from the human-robot collaboration here described, improvisation extends beyond its traditional borders in a remarkable way. Not only as a tool for creative exploration, improvisatory practices become a way to delve deeper into the topical question of what the role of technology in our contemporary world is and how we should relate to it.

In the ontology offered by MST the distinction between composition, performance, and improvisation is weakened. As showed by the two examples here presented, in contemporary art forms as well the use of technology is contributing to making this division even fainter. Thus, the framework provided by MST is suitable to understanding and contextualizing established and emergent kinds of improvisation, offering improvisation equal, if not higher, status than other artistic forms.

Further research is needed as new forms of art emerge and, with them, new forms of improvisatory practices. Art is moving away from the paradigm of static and prefixed art forms towards more flexible and fluid models where improvisation occupies a decisive role. In order for this investigation to be successful, though, it is necessary to acknowledge the pervasiveness of improvisatory practices and to recognize the relevance of the process alongside the product for the nature of established and emerging art forms.

Related Topics

Wilson, A. (This Volume) “Improvisation and Authenticity in Early 20th Century Western Music.”

Notes

1 See Bresnahan 2015: 573 f. Arguably, most of the literature on improvisation focuses on improvisation in jazz, see Baker 1988; Berliner 1994; Brown 1996; Carvalho 2010; Hagberg 2008; Iseminger 2010; Monson 1996; Reeves 1989; Young 2018; Young and Matheson 2000.

2 For a discussion on of how improvisation survived also through the Classical period through the practice of virtuosos, see Goehr 1992: 188. See also Bertinetto 2016: 45 and Wilson, this volume.
10 I will be quick in the overview of the theories of improvisation, since the main aim of the chapter is not criticizing other views on improvisation but instead showing how MST accounts for it. For a more detailed discussion on the topic, see Alperson 1984; Bresnahan 2015; Brown 1996; 2000; Gould and Keaton 2000; Hagberg 1998; Lewis and Pickut 2016; Love 2016; Magnus 2016; Sterritt 2000; Valone 1985; Young and Matheson 2000.

11 By using “work” and “performance” here I do not refer necessarily to musical works and performances, but to every kind of art that requires an agent and a final product. This is not limited to performing arts; in painting and sculpture as well it is indeed possible to individuate both a work and a performer, namely, the painting/sculpture and the artist.

12 This claim needs a specification. The non-repeatability of the original improvisation affects the identity of the performances that use it as a model. That is, unlike what happens with traditional works, if an improvisation is used as a model for further performances, the latter cannot be deemed improvisations. I acknowledge that not everybody may agree with the claim that improvisations are not repeatable (see Ruta 2017: 514 ff; against the unrepeatability of improvisation). I will come back to this point in the next section when I talk about how MST addresses the issue of repeatability. See Bertinetto 2012b: 106–22; 2016b: 115, 133, 166 on the non-repeatability of improvisation.


14 Andrew Kania, Stephen Davies, and Lee B. Brown all agree in respect to this (see Bresnahan 2015: 578).


16 This may not necessarily be deemed a serious shortcoming if one is more interested in individuating the distinctive aspects of improvisatory practices instead of including them within an independent ontological theory. However, I argue that the inclusion of the definition of improvisation within an ontological account has the benefit of granting improvisation a relevant status, recognizing the impact that it can have in shaping the nature of art forms to which it is applied, as we will see when examining the case of human-machine co-improvisation.

17 See also Bertinetto 2016: 5.

18 For reasons of space I cannot discuss of MST in detail. For an in-depth exploration of its claims see Moruzzi 2018a; 2019.

19 I am referring here to “intellectual” music, not to popular traditions.

20 See also the images produced by CANs and which were presented at ArtBasel 2016 (Elgammal et al. 2017), the Next Rembrandt project (accessible at https://www.nextrembrandt.com (accessed October 26, 2020)), and the portrait Edmond de Belamy, from La Famille de Belamy, generated by the Parisian collective Obvious and sold for $432,500 at Christie’s in October 2018. On the topic of AI and creativity see also Moruzzi 2020 and Moruzzi 2021.

21 Although it is now increasingly recognized that also certain animals are capable of creative thinking, see Kaufman 2015; Mendes et al. 2007.


23 See Bresnahan 2015: 579; Lewis and Lovatt 2013: 47; McCormack and D’Inverno 2016: 102.
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24 See for example Collins 2010; McCormack and D’Inverno 2016. However, not everybody agrees that a true collaboration is possible, see Lopes 2001.

25 More detailed examples of Chung’s work can be found on her website, at https://sougwen.com (accessed October 26, 2020).


28 It can be argued that, in the interaction between humans and machines, only humans are improvising (Lopes 2001: 76). The one on the impossibility for machines to create randomness is an ongoing debate, see https://engineering.mit.edu/engage/ask-an-engineer/can-a-computer-generate-a-truly-random-number/ (accessed October 26, 2020). While I grant that this is largely true, research is moving towards improving creative capacities in artificial systems and, with creativity, these systems are also developing improvisatory and intuitive abilities, see Lehman et al. 2018 and https://www.quantamagazine.org/how-to-turn-a-quantum-computer-into-the-ultimate-randomness-generator-20190619/ (accessed October 26, 2020).


30 Here I refer in particular to the problem of transparency, see Beaudouin et al. 2020; Yampolskiy 2019.

31 See Huang et al. 2019; Fiebrink 2011; Laurenzo 2008; Sebe et al. 2004 for examples of how human-computer interaction can enhance creativity.

References


Caterina Moruzzi


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