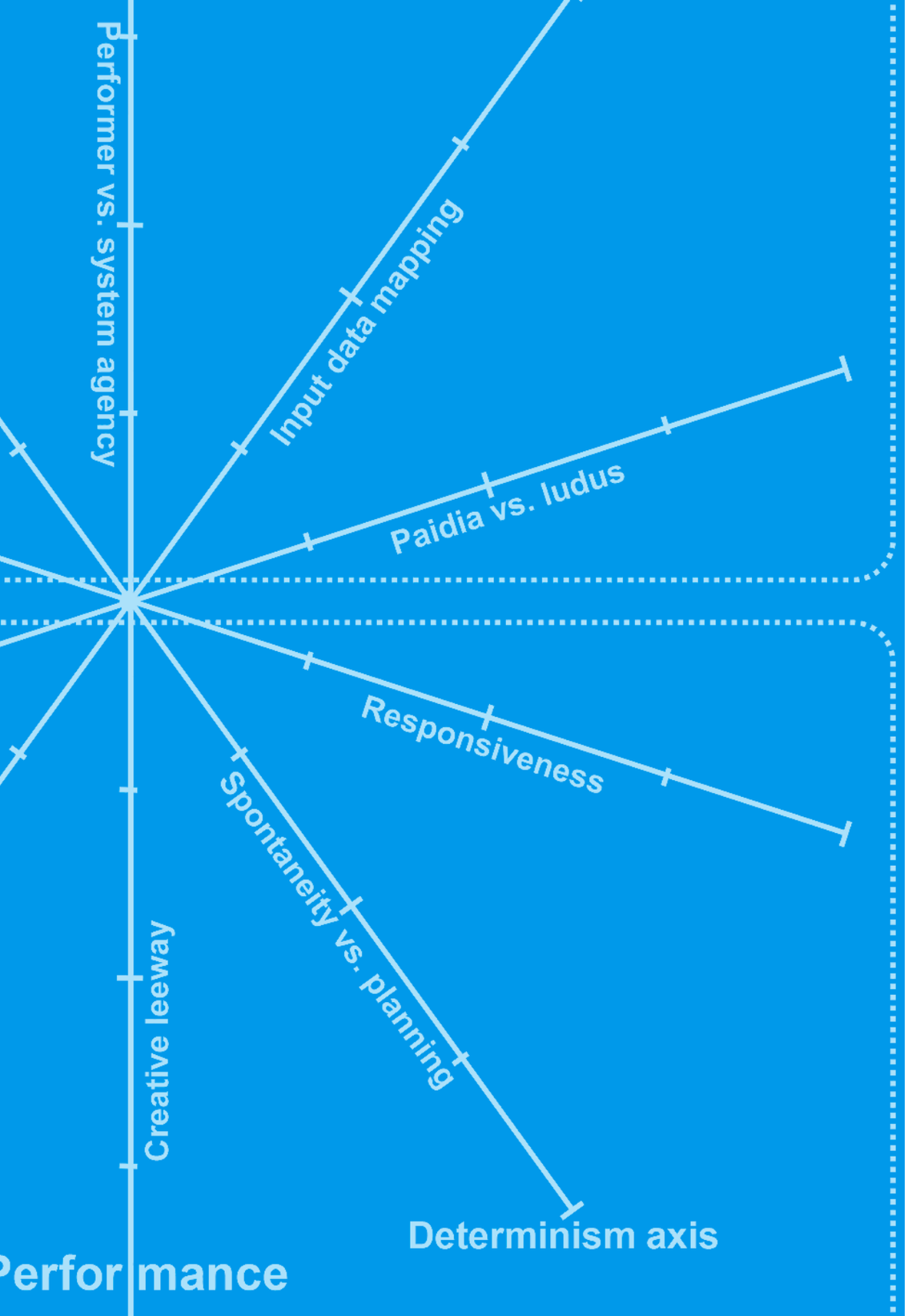





Marko Ciciliani

# A POLAR DIAGRAM FOR THE ANALYSIS OF GAMIFIED AUDIOVISUAL WORKS

## 1. INTRODUCTION

This article describes a method for analyzing works that use elements of computer games. The method was developed as part of the artistic research project "GAPPP – Gamified Audiovisual Performance and Performance Practice." This project's main focus is to investigate the aesthetic effect of computer game elements within the context of performance-based audiovisual compositions. When speaking of performance-based compositions, we refer to works that usually are performed within the context of a concert and that involve performers. As already mentioned in the book's introduction, the aim is not to produce so-called 'music games,' but to investigate how behaviors and configurations that are typical of computer games expand and enhance possibilities of artistic expression in the field of experimental audiovisual composition.

As part of this project, new works were commissioned that concentrate upon various issues relevant to our research. Altogether, nineteen new works had been created by ten artists, all differing significantly in terms of their aesthetic approach, their technical dispositives, the role they give the performers, and the way they relate to their audience among other aspects. As the repertoire grew, comparing the works became an increasing challenge. As there are not very many analytical methods in the field of audiovisual composition and performance practice, and as the present combination of game elements and performance-based multimedia systems entails

special traits and criteria of its own, we needed to develop a suitable method in order to investigate and then compare these works.

The present article introduces a new method of this kind. This approach incorporates concepts from game theory, composition and performance analysis. Even though the method is aligned with our specific combination of game elements, performance, and audiovisual composition, with minor adaptations it could also be applied to related dispositives beyond this specific field.

## 2. THE POLAR DIAGRAM

Our method is based upon a polar diagram that represents ten parameters along five axes [Fig. 1]. Depending upon how pronounced an individual parameter is, values are recorded graphically on the corresponding axis. If a parameter represents a polarity between two terms, such as "performer vs. system agency," the parameter's graphic representation corresponds to the terms' position on the axis. This means that in the case of this particular parameter, "performer agency" is situated at the outermost point of the axis, while "system agency" is located at the center of the diagram. The opposite is the case for the parameter "spontaneity vs. planning," for example. Here, the term "spontaneity" lies close to the center of the diagram and the term "planning" near the outermost point, with a corresponding polarity of the semi-axis.

Once values have been allocated to the individual parameters, they are connected with straight lines [Figs. 2–5]. This gives rise to a characteristic shape that can be compared to other graphs produced by analyzing other works. Similar shapes suggest traits that the works have in common, which may not be obvious at first glance. Conversely, shapes that turn out differently from one another reveal specific differences between works that subsequently can be investigated in greater detail.

This approach, and particularly the use of polar diagrams, is built upon earlier publications by Birnbaum et al. (2005), Magnusson (2010), and my own method for analyzing electronic music performance practices (2014; Ciciliani and Mojzysz 2015). In this article's third section, I will explain first the axes' graphic disposition and then each individual axis with its appurtenant parameters. Where convenient, I will illustrate the parameters using brief examples. The fourth section will investigate the latent point symmetry that forms the paradigmatic foundation for the parameters' disposition and offers a starting point for comparative analyses. In the fifth section, I will describe and briefly analyze three different audiovisual compositions created as part of our research project before comparing



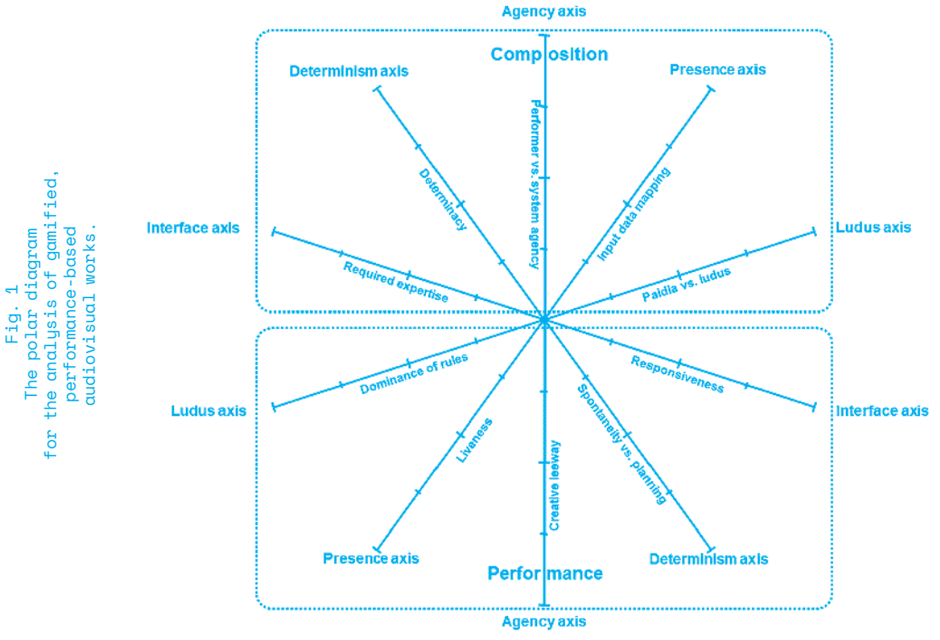



Fig. 1
The polar diagram for the analysis of gamified, performance-based audiovisual works.

them. The aim here is to clarify the method through applying it and in doing so review its fitness for purpose. Section 6 summarizes and evaluates the results, before the seventh and final section details the usefulness of applying categories within the context of artistic research as well as the potential hidden risks involved.

## 3. THE AXES AND PARAMETERS

Each of the polar diagram's five continuous axes combines two parameters that refer either to the same phenomenon or to related phenomena. The part of the axis in the upper half of the polar diagram refers to questions concerning the compositional choices made in the work under investigation, while the part of the axis in the lower half focuses upon the performers' perspective. The five different axes are called the interface axis, determinism axis, agency axis, presence axis, and ludus axis.

The following paragraphs give an explanation of the axes and their parameters.

Generally, the entire audiovisual technological system is regarded as a single compositional unit with which the performer interacts and thus enters into a relation. In the following descriptions, both the technological audiovisual system and the performers are treated as individual agents. In most cases, this represents a simplification.

For one, the technological system can be made up of very different components, both in regard to the media used—such as light, video, sound—and different reactions or behaviors. For another, a work may be realized not by an individual person, but by several performers or even an entire ensemble. This reduction of complexity is deemed acceptable, however, as it allows us to recognize superordinate characteristics.

## 3.1 INTERFACE AXIS

The interface axis describes in qualitative terms the means available to performers to express themselves artistically and represents a point of intersection with the technological system.

### 3.1.1 REQUIRED EXPERTISE

The section of the interface axis situated within the diagram's composition area tells us whether using the interface requires practice and expertise, or whether the interface is a generic instrument[1] that can be used without extensive prior training. As the selection of a particular interface or instrument normally forms part of the compositional decision-making process, this parameter is located in the diagram's upper half.

Interfaces requiring expertise include many traditional instruments, the mastery of which normally takes many years of practice, as well as more modern varieties of game controllers that often offer up to twenty parameters through different buttons and joysticks and accordingly require sophisticated handling. By contrast, a percussion instrument that is simple to play or a manageable number of control buttons constitute examples of accessible interfaces.

This question does not take into account details related to mapping or response sensitivity, most of which depend on the implementation of software. There are numerous cases, particularly in computer games, which use very rudimentary interfaces that nevertheless need to be applied with great precision and whose operation thus can only be mastered through practice. We might think of the classic computer game *Pong*, where a single potentiometer is operated to control the position of a virtual tennis racquet, a task that becomes more and more challenging as the speed increases. The parameter "required expertise" does not take such software-based couplings into account, indicating only whether the interface suggests to the audience that its use requires a more general rather than specific knowledge and understanding, thus giving the impression

1
In the present context, the terms "interface" and "instrument" generally are used synonymously, with the latter term referring mainly to traditional instruments.



that they could easily carry out the performer's actions themselves, or whether special expertise is required for its operation. As the use of every interface needs to be learned, the question of whether or not something seems "accessible" requires critical scrutiny of the user groups for whom this assessment holds true. Interfaces from the gaming industry in particular often appear accessible to audiences familiar with the sector. However, the case is very different for users with no experience of this field.

### 3.1.2 RESPONSIVENESS

In contrast to the parameter described in section 3.1.1, the half of the axis that extends into the performance area describes the interface including its software-based implementation. Accordingly, the focus no longer lies on the external perception of the interface, but on the way it feels for the performers, including the whole range of its behavioral characteristics. Here the interface is therefore understood as part of a more comprehensive input system, and the software context is taken into account. This parameter indicates whether the control at the performer's disposal is sensitive and fine-grained, or whether only cruder operations are possible. This refers not only to individual perceptions of how sensitively an individual parameter is captured and processed, but also to the general feel of control conveyed to the performer.

## 3.2 DETERMINISM AXIS

This axis describes the technological system's algorithmic configuration and the manner in which this translates to the performance. It is concerned with whether the technological system's behavior is consistent and predictable, or whether unexpected events can occur in every performance.

### 3.2.1 DETERMINACY

This parameter indicates whether the composition is structured deterministically or whether numerous random or otherwise unpredictable processes are involved. Here, the difference between randomness and determinacy should be understood in a qualitative sense. There are many fully determined processes whose results possess an unpredictable quality.[2]

For this parameter, observing the actual effects of the algorithms is important. Even widely implemented random processes can have only a marginal impact upon a work's shape if they only take effect

2
As our evaluation is qualitative, the fact that only pseudo-random processes exist in digital systems plays no role here.

on the level of detail. Klarenz Barlow's 1986 *variazioni e un pianoforte meccanico* serves as a musical example here. This is a generative composition for a computer-controlled piano in which almost every detail differs in each performance. As a whole, however, the *variazioni* possess a recognizable form and dramaturgy and thus have a determined quality overall. By comparison, random decisions that affect the generation of formal elements or the selection of the tonal material, for example, have further-reaching consequences. Henri Pousseur's 1956 composition *Scambi* is made up of instructions that subject both the selection of the tonal material and the musical form to random processes. Accordingly, there are very different versions of this piece—and the composition's structure thus can be called non-determined.

### 3.2.2 SPONTANEITY VS. PLANNING

This parameter describes how the compositional structure described in section 3.2.1 translates to the performance and to the development of an interpretation. If the piece in question turns out very differently in each performance, performers need to possess the capacity for spontaneous reaction and adaptation. By contrast, a composition that takes a similar or even identical form each time it is performed makes it possible to plan in a different way when developing an interpretation.

Developing any interpretation requires that essential aspects of the piece remain consistent in the broadest sense and thus can be repeated. However, such a consistency can take place on different levels. Even if a piece contains unpredictable aspects and thus requires the performers to be correspondingly flexible, this can still represent a consistency for which the performers can prepare in the sense of an interpretation: they are prepared for having to react spontaneously in a certain way and within a familiar framework. John Zorn's *Cobra* (1984) serves as an example of this. On the one hand, this piece allows its performers to improvise freely within a framework of predefined rules. On the other hand, a range of rules guide the interaction between the performers, meaning that this predefined framework places each action selected in a specific context in each realization of this composition. When compositions define precise details and require these to be carried out each time the composition is performed, this enables the planning of interpretative details that would not be possible in a piece such as *Cobra*. This applies to all traditionally notated works among others and thus also describes classic performance practice. Here, however, we are dealing with compositions that work with game elements in some shape or form. This usually means that performers are given a flexible range of possible actions, something that a traditionally



notated score tends to exclude from the outset. Nevertheless, it is still possible to distinguish clearly between "spontaneity and planning," as the limits set to this range of possible actions can vary significantly.

In sum, this parameter thus describes whether the interpretation of a given composition requires a high degree of spontaneous actions and decisions, or whether the piece's course is predefined in such detail that it becomes possible to plan the interpretation of all the subtleties of its performance.

### 3.3 AGENCY AXIS

This axis describes the distribution of agency in the work's basic design, and the manner in which this affects its performance.[3]

### 3.3.1 PERFORMER VS. SYSTEM AGENCY

This parameter indicates whether it is predominantly the performers who possess agency in a composition, or whether this agency is designed to be part of the technological system. If an agent takes an active role in a network of direct relations—of which game-based systems normally consist—he or she forces the other agent to behave reactively.

We are usually dealing with performer-based agency when the system functions as an extension of the performers' instruments. Each traditional instrument is characterized by various limitations and possible challenges. Overall, however, an instrument's behavior is consistent, making it possible for the instrument to be learned. When performers have mastered the instrument, they act as agents, rather than the other way around. Their playing 'forces' the instrument to behave in a certain way, so to speak. The opposite goes for instruments whose behavior is not fully predictable, as is the case with no-input mixers, for example. The no-input mixer is a conventional mixer console where the outputs are connected with the inputs, creating internal feedback loops that produce various different sounds. By selecting certain settings, no-input mixers can be set to exhibit unstable behavior. In situations like this, performers find themselves partly in a reactive role, as they constantly have to adapt to the instrument's behavior. This gives rise to a situation somewhat like a dialog between the instrument and the performers, in which the former possesses at least as much agency as the latter. The agency that I described as characteristic for the no-input mixer is often also exhibited by more complex interactive technological setups, especially when they are based on competitive game principles.

3 "Agencies" refer to nodes within a network of relations that are able either to act autonomously or to effect change in a given state in some other way. Agency can proceed from the performers as well as from the technological system. An agent can take action both actively and reactively, or remain in a neutral, passive state.

### 3.3.2 CREATIVE LEEWAY

This parameter describes the extent to which the performers are able to flexibly shape the composition. For example, if during a performance they need first and foremost to react to proactive behavior proceeding from the system, we can expect the performers' overall creative leeway to be more limited than if the relation were reversed.

My own composition *Atomic Etudes* (2016) serves as an example here. In this piece, the performers' task is to react to the movements of trajectories on a display of 16x16 LED buttons. Here, the system clearly is the dominant agent, and while performers certainly still can influence the composition's temporal shape, they otherwise remain restricted to a reactive role. The performer has a comparatively large creative leeway in Christof Ressi's composition *game over* (2018), which will be discussed in detail below (cf. 5.1.2). In this piece, the performer does not need to react directly to any of the system's actions, which allows him or her greater leeway accordingly.

## 3.4 PRESENCE AXIS

This axis describes whether the performers' actions affect the system's behavior and whether it is possible to identify the effect of these actions in the system's behavior, for example through sounds generated or visualizations. This is based on the understanding that in certain cases technology can not only sustain, but even amplify the performers' presence. This view builds upon Philip Auslander's position that technology does not contradict the presence of performers in a performance situation (2008), opposing the stance adopted by Erika Fischer-Lichte among others, who claims that presence only comes about in the direct and technologically unmediated encounter between audience and performers (2004, p. 47).

### 3.4.1 INPUT DATA MAPPING

This parameter indicates whether—in purely quantitative terms—a large number of data are extracted from the performers' playing and used to trigger other acoustic or visual events. This includes methods such as amplitude following, pitch detection, and timbre descriptors as well as capturing physical movements using motion tracking or accelerometers.



### 3.4.2 LIVENESS

This parameter describes a system's ability to react to the performers' actions. Here, the term "liveness" is understood in the sense of composer John Croft's description of an "*aesthetic liveness*, by which … aesthetically meaningful differences in the input sound are mapped to aesthetically meaningful differences in the output sound" (2007, p. 61). In other words, this parameter indicates to which extent the system's behavior reflects the performers' actions, for example through the system being experienced as a part or an extension of their instruments. This refers not only to the system's sonic behavior, but also to possible visual translations of the performers' actions. Here, it should be noted that the term "liveness" usually describes a quality that the audience is able to experience. However, as we are dealing with the half of the polar diagram that refers to the performers, this parameter needs to be described from their perspective.

## 3.5 LUDUS AXIS

This axis refers to the manner in which game-related aspects manifest within the context of the work under consideration.

### 3.5.1 PAIDIA VS. LUDUS

The distinction between these two concepts goes back to the game theorist Roger Caillois: "Paidia represents wild, free-form, improvisational play, whereas ludus represents rule-bound, regulated, formalized play" (Salen and Zimmermann 2004, p. 308). The former usually encourages an explorative approach, where players can indulge in free variations, while the latter subjects them to a more rigid set of rules that defines their behavior. We can distinguish between these approaches and numerous intermediate variants in the present audiovisual context, too. Which of these two concepts is implemented is a decision that concerns the composition's general design.

### 3.5.2 DOMINANCE OF RULES

This parameter refers to the same phenomenon as 3.5.1, namely the balance between paidia and ludus. In contrast to the preceding parameter, however, here the explicit concern is to describe the way that the performers experience these qualities.

In practice, divergences to the value ascribed to the previous parameter can occur if, for example, a strict straitjacket of rules

predominates, which does not prevent the performers from enjoying other significant leeway while fulfilling these guidelines.

As the experience of our project has shown, even in compositions dominated by strict game-related rules, merely adhering to rules does not lead to a satisfactory performance. When realizing the composition, the performers need to integrate the set of rules into an artistic interpretation. While games address gamers first and foremost,[4] performers communicate their interpretation of a work to an audience, even if this audience is only notionally present, as in a rehearsal situation, for example. Accordingly, they are not playing for themselves, but presenting their understanding of the work to someone else. This requires a manner of playing able to do justice to this situation (for a more extensive discussion, see Lüneburg 2018a and b).

## 4. POINT SYMMETRY AS A COMPARATIVE TEMPLATE

The axes and parameters are ordered in such a way that a hypothetical standard situation could arise in which the two parameters of the same axis have similar values, leading to a point-symmetrical diagram. In concrete terms, this means that hypothetically a high value for one parameter of an axis can lead to a high value for the complementary parameter of the same axis. This is based upon the following assumptions:

- For the interface axis, we anticipate that an interface whose use requires extensive practice offers greater control and artistic leeway than a generic interface.
- For the determinism axis, we assume that a deterministic design will probably lead to a more predictable situation for the performer than a design based upon a lot of random decisions.
- In the case of the agency axis, we expect a situation in which key agencies are subject to the performers' will means that the performers also have greater interpretative leeway.
- For the presence axis, we assume that numerous and pronounced mappings increase the performers' sense of liveness while playing, as many of their actions are transformed into data and processed further.
- For the ludus axis, we anticipate that a design based upon the concept of paidia is more likely to lead to the development of artistic free play than a strict rule-based context.

4 The recent development of e-sports, gaming channels and machinimas has increasingly called this perspective into question, and some theorists now understand computer games as performances. See thereto Leino (2017) among others.



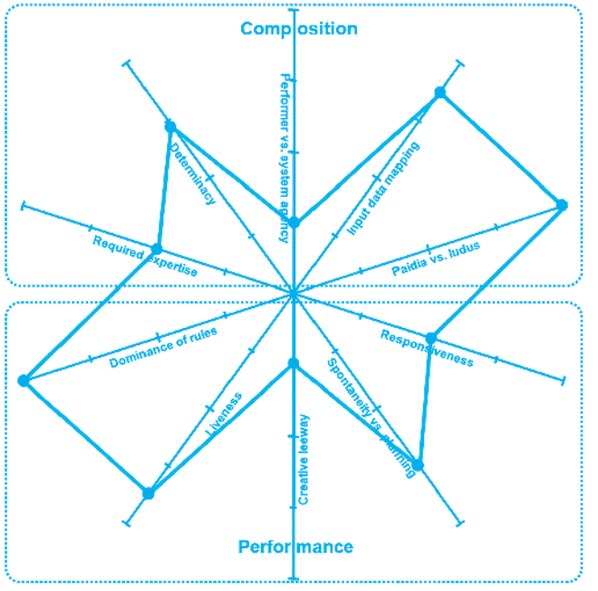



Fig. 2 A hypothetical analysis exhibiting perfect point symmetries.

If all these assumptions are realized, the value assigned to one parameter of an axis should be mirrored on the opposite half of the axis. The diagram's overall shape would thus be point symmetrical, as seen in Fig. 2.

When applying this method to concrete compositions, the parameters on the same axis are rarely actually symmetrical. An example concerning the presence axis illustrates this. It is conceivable that in a given work, the performers' playing is translated into data in various ways (→ high value of the "input data mapping" parameter). If these data are not processed in a way that is transparent and comprehensible to the performers, the degree of liveness experienced certainly could be low (→ low value of the "liveness" parameter), which would lead to an asymmetry on this axis. The opposite asymmetry is also conceivable: thus the skillful linking of very few parameters can help to create a very strong sense of liveness if the performers are able to understand and easily control the effect of these parameters.

The assumption of point symmetry as a hypothetical standard model forms a helpful criterion for analyzing a diagram. Thus it is interesting to begin analyzing a diagram by searching for asymmetries and investigating why these have come about in greater detail. This makes it possible to quickly recognize and identify a given work's specific individual traits. The following examples and their analyses serve to illustrate this.

## 5. EXAMPLES

In the following, three examples will be presented briefly in order to show how similarities and differences between different compositions lead to a specific diagram shape, and how these diagrams subsequently can be analyzed and interpreted. The images in Figs. 3–5 show the diagrams of my analyses of the works *To Kill Two Birds With One Stone* by Martina Menegon and Stefano D'Alessio, *game over* by Christof Ressi, and my own composition *Kilgore*.[5] I will first describe the three works, then compare the diagrams and present an analysis of individual aspects.

### 5.1 ANALYZED WORKS AND DIAGRAMS

#### 5.1.1 *TO KILL TWO BIRDS WITH ONE STONE* BY MARTINA MENEGON AND STEFANO D'ALESSIO

*To Kill Two Birds With One Stone* is a work for two performers that can also be realized by members of the audience. It consists of an adaptation of the 1972 classic game *Pong*—one of the first commercially available computer games—in combination with the centuries-old game *Rock, Paper, Scissors*.

*To Kill Two Birds* uses a design based upon a table-tennis table. The two performers stand across from one another. The table consists of a large monitor, lying flat, on which all of the visual part of the composition takes place and which provides the performers with visual feedback on their actions. *To Kill Two Birds* is performed using two physical interfaces, namely LeapMotions,[6] which are attached to the edge of the performers' sides of the table. The performers need to move their hand horizontally across the interface, which then transfers the movement to a virtual 3D model of a hand on the screen. This virtual hand takes on the function of the tennis racquet in the game *Pong*. While in *Pong* a small square is played to and fro between the players like a ball, analogously to a game of tennis, *To Kill Two Birds With One Stone* replaces this ball with the model of a further virtual hand. This hand forms different shapes, either a fist, an open palm, or a V sign. In the game *Rock, Paper, Scissors* these shapes represent the materials in question. The two competing performers need not only to pass the floating hand to their antagonist, but also to adopt the correct physical hand shape according to the rules of *Rock, Paper, Scissors: paper* (flat hand) to hit the 'ball hand' if it has adopted the shape *rock*, *rock* (fist) as a reaction to *scissors*, and *scissors* (V sign) in response to *paper*. The LeapMotion interface recognizes not only the horizontal position of the performer's hand, but also the positions of the individual fingers and thus is able to distinguish between the different gestures. The work's musical components are created when the virtual hands touch one another and are dependent upon the shape formed by the hands involved; each combination of hand shapes creates a different sound respectively. Accordingly, the events driven by the performers generate an extensive, variation-rich sound texture that is linked directly to the events on the monitor.

The rules and goal of the piece are clearly structured and can be grasped quickly even by an audience who have not been given an explanation. Each performance runs through three increasingly challenging levels, with an overall performance time of only a few minutes. While the work can be performed as part of a concert, it is conceived as an installation first and foremost. As it is based upon two popular games, which usually are familiar even to a non-gaming audience, it can also be realized spontaneously by visitors.

#### 5.1.2 *GAME OVER* BY CHRISTOF RESSI

*game over* adopts the aesthetics of a 2D platform or a Jump'n'Run game. This work was developed by Christof Ressi for and in close collaboration with the clarinetist Szilárd Benes. In the performance, the clarinetist stands directly in front of a projection screen, his back to the audience. An accelerometer is attached to the instrument. By moving the clarinet in different directions, Benes is able to move a small avatar on the projection screen and thus interact with the environment in various ways. This work is conceived as an open-world design without any rules or goals. The world presented contains a number of different environments characterized by specific visual designs and different musical options. In addition to the different environments, there are also location-specific objects and NPCs,[7] all of which behave differently and involve different sonic traits. The exploration of the different environments has a form-generating effect, as each environment and its traits create a certain atmosphere and sonic environment.

Benes navigates the environments by improvising on his clarinet, making physical gestures that move the avatar in the desired direction. As far as the navigation is concerned, the digital system does not react to the acoustic signal of the clarinet. In technical terms, the navigation thus takes place independently of the clarinetist's playing. In Benes's actual realization of the piece, however, a close link between the music material and his physical gestures emerges. As the basic configuration of *game over* is based upon an open world design, Benes is able to control how long a performance takes. Shorter performances last around 10 minutes, but if Benes wishes to explore the full potential of the 'world,' performances can take 30 to 45 minutes. One specific trait of this work is that Ressi frequently redesigns the

5 Video documentations of these works are available on the attached USB stick, or can be accessed and viewed online via QR codes.

6 www.leapmotion.com (July 3, 2019).

7 NPC stands for "non-player character." NPCs are virtual creatures in the digital game that are governed by algorithms and thus cannot be controlled directly by the performer.

world, interweaving the regions with their different characteristics in new ways. Furthermore, the two artists have agreed that Ressi will incorporate new surprises for each performance, for example by changing the digital world's spatial design in such a way that Benes can never count on the game environment being the same as in his last rehearsal. This means that each performance really does contain unexpected events for Benes, requiring spontaneity, quick reactions and musical adaptability.

### 5.1.3 *KILGORE* BY MARKO CICILIANI

*Kilgore* is an audiovisual work for two performers, with a projection screen allocated to each. The screens show a comparatively extensive and complex 3D environment. The performers play instruments. Various instruments can be chosen, the only restriction is that one of the instruments involved needs to be amplified and able to realize controlled feedback loops (e.g. an electric guitar or—as in the documentation included—an amplified violin). However, in the two most extensive sections of this five-part work, the performers lay down their instruments and use a game controller to navigate an avatar through the virtual 3D landscape allocated to them. The avatar is used to carry out different actions and tasks, through which the composition's sonic range unfolds. The basic relation between the performers is competitive—they pursue different tasks, which they attempt to complete successfully.

The performers use their instruments in pre-, inter- and postludes. Their instrumental actions are accompanied by mostly pre-produced audiovisual sequences. In the prelude, rule-bound rhythmic and melodic formations form a foundation that the performers then realize jointly in a tightly interwoven manner.

After two to three minutes, there is a transition to the first part of the piece that is carried out using the game controller in the virtual 3D landscape. This landscape is barren and rocky, with a lake with an island and a house built at its center. In this part, the tasks that the performers need to carry out using their avatars take place only in the landscape around the lake. These tasks consist first and foremost of collecting objects, leading to an increasingly dense synthetic tonal texture that finally erupts in a climax and dissolves. During the subsequent interlude, one of the players performs improvisatory melodies using feedback loops, carried out in interaction with an amplifier on the stage. Next follows the second part to be realized in the virtual landscape. Both performers cross the lake and carry out tasks on the island, which then allows them to enter the house. While the music of the first part in the virtual landscape was shaped by sometimes dense harmonic textures, up to this point the sounds



effected by the performers are either melodic or noise-like. Entering the house sets off penetrating rhythmic patterns that the performers need to interrupt by carrying out certain actions, which in turn triggers new rhythmic patterns until here, too, the rhythmic texture erupts and dissolves in a multi-layered tonal conglomerate. At this point, the winner is identified based upon the number of successfully completed tasks.

The composition ends with a postlude based upon a variation of the rule-based rhythmic and melodic formations already realized in the prelude.

## 5.2 COMPARISON AND ANALYSIS

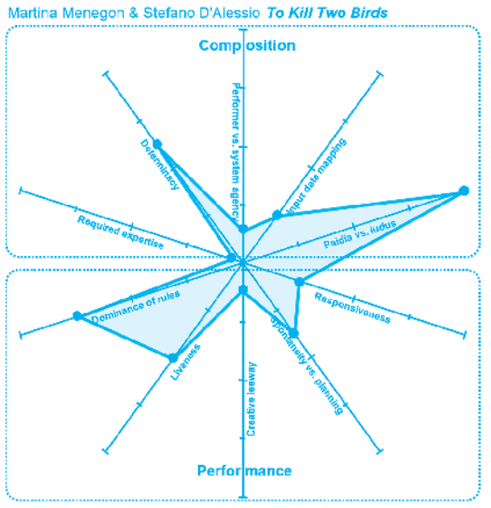
The diagrams of the respective pieces [Figs. 3–5] show clearly that the expressions of the individual parameters and accordingly the resulting forms on the polar diagrams are different for each work. Each form shows characteristics typical of the composition in question.

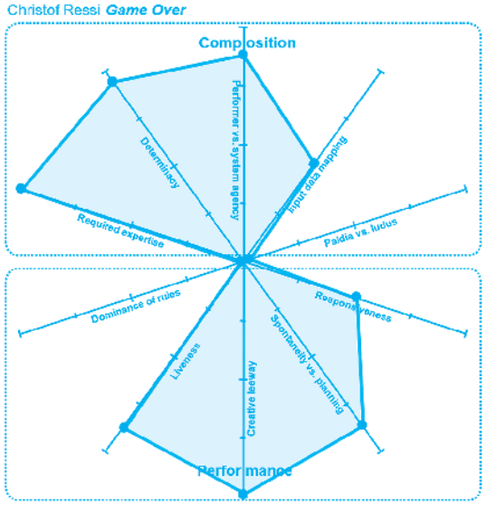
### 5.2.1 *TO KILL TWO BIRDS WITH ONE STONE* AND AUDIENCE PARTICIPATION

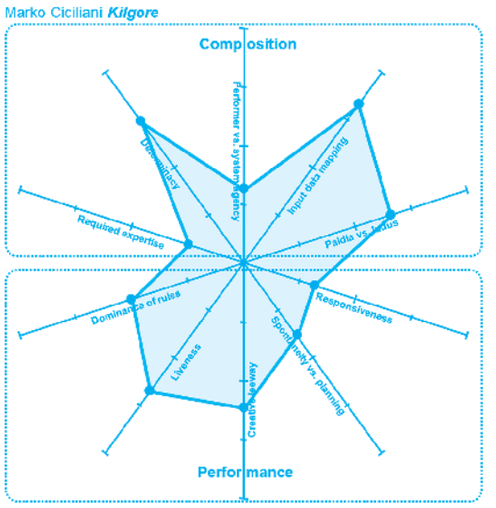
Strikingly, the diagram of *To Kill Two Birds With One Stone* differs strongly from those of *game over* and *Kilgore* with regard to some of the parameters. Thus the parameter "required expertise" has a very low value in *To Kill Two Birds*, while it is much higher in the other two diagrams. The parameter "input data mapping" likewise is less pronounced in comparison. At the same time, in *To Kill Two Birds* "paidia vs. ludus" the parameter "ludus" has the maximum value, in contrast to the other two works. Finally, it should be emphasized that the parameter "creative leeway" is relatively less pronounced in *To Kill Two Birds*. In the following, I will argue that the differences mentioned above are typical of the fact that *To Kill Two Birds* was conceived with audience participation in mind and should be possible to implement spontaneously by audience members with no prior knowledge of the work. By contrast, *game over* and *Kilgore* were composed for musicians who have engaged with and rehearsed the works in question over longer periods of time.

If a work is to be accessible to a general audience, it is imperative that no expertise is required to operate the interface, which thus can be used spontaneously. Accordingly, for *To Kill Two Birds* the "required expertise" value is almost at the minimum, while it is at the maximum in *game over*. In *Kilgore*, too, the value is higher, even

Figs. 3–5
Three different polar diagrams describing the works *To Kill Two Birds With One Stone* by M. Menegon and S. D'Alessio, *game over* by C. Ressi, and *Kilgore* by M. Ciciliani.




though it is significantly lower than in *game over*. This is because the majority of the composition is realized using gamepads, which are fairly easy and quick to learn as compared to a clarinet. The fact that the parameter "input data mapping" is lower in *To Kill Two Birds* than in the other diagrams is due to the comparative simplicity of its interface. Even though the individual actions of the performing audience members trigger synchronous sound events, it is only the horizontal hand position that is captured by the system. The number and variability of the data harvested from the performers' actions in both *game over* and *Kilgore* is significantly higher. The maximum value of "paidia vs. ludus" shows that the performers are practically only reacting to events. Accordingly, they have scarcely any opportunity to trigger events autonomously or create any other kind of emphasis. This also gives rise to the lower value of the parameter "creative leeway," which is significantly higher in the other two works because of the aforementioned greater flexibility of the interface.

None of the limitations mentioned with regard to *To Kill Two Birds* in comparison to the other two works constitute a loss in quality. Rather, they reflect the consistent implementation of this work's concept, namely accessibility to as large an audience as possible, enabling this audience to experience the work directly instead of passively observing professional performers present it.

### 5.2.2 POINT SYMMETRY

As mentioned above, the question of point symmetry offers a good starting point for analysis. In the following, I will examine this aspect more closely, first in *game over*, then in *Kilgore*.

In *game over*, the diagram shows clear symmetries for the determinism, agency, and ludus axes. By contrast, the interface and presence axes are asymmetrical. With regard to the asymmetry on the interface axis, the interface can be described as highly specialized. It consists of a clarinet with an accelerometer, an instrument that requires many years of practice before it can be played competently. Even though the instrument offers numerous possibilities for expression, this in itself does not lead to a highly sensitive overall system. This is because the instrument largely functions independently of the audiovisual system and the interacting data only come from the accelerometer attached to the clarinet, which does not react directly to the musician's playing. Furthermore, the interaction with the graphic elements in the audiovisual environment is often based on the binary switching on and off processes, without any nuanced intermediate levels. Accordingly, the interface between the performer and the audiovisual system is much less sensitive than the clarinet as an instrument. Here, too, I would like to note that this evaluation should by no means be interpreted as criticism, and indeed all of the values ascribed to the parameters are non-judgmental. Rather, here we are dealing with a translation of the musician's

actions that corresponds precisely to the composition's overall aesthetic, which in many regards refers to the computer games aesthetics of the 1980s and early 1990s. This auditory and visual low fidelity is continued in the somewhat crude coupling of the instrument. The same reasons also lead to the asymmetry on the presence axis, where the parameter "input data mapping" has a much lower value than the parameter "liveness." The high value for "liveness" can be traced back to the fact that playing the clarinet in itself offers a broad range of expression, and that due to the accelerometer the coupling to the audiovisual system is very physical and direct. Because of the above, only a limited number of all the performer's actions are passed on to the audiovisual system in digital form, which is reflected in the lower value for "input data mapping."

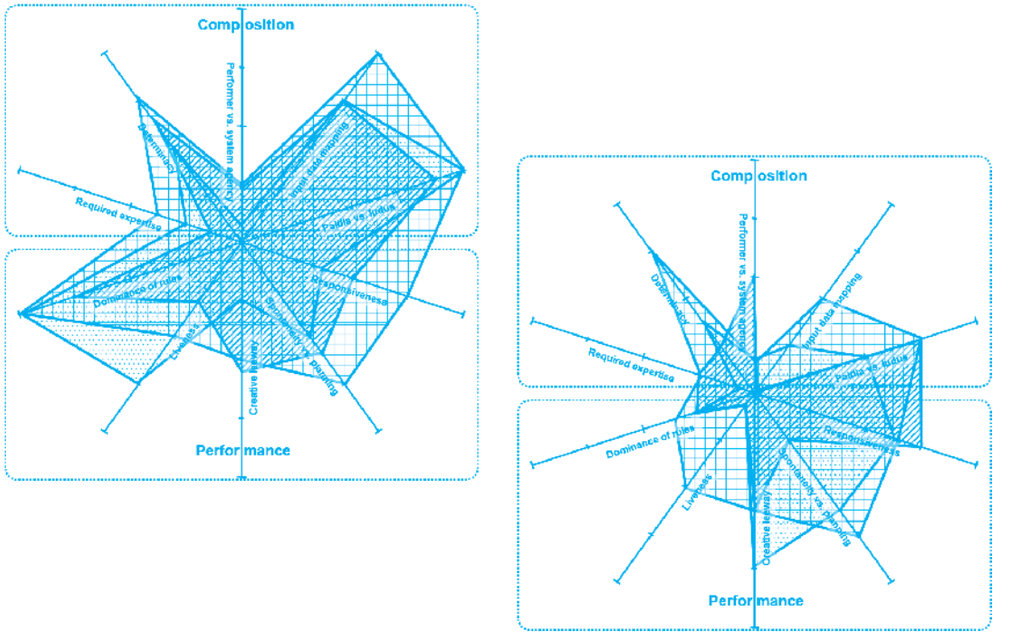
Fig. 6 *(left)*
Three analyses of the same work conducted independently by three different researchers. Despite the difference between the individual values, a similar shape emerges in all three cases.

Fig. 7 *(right)*
Three analyses of a different work conducted independently by three different researchers, where the resultant diagrams do not share a similar shape.

In *Kilgore*, there are hardly any exact point symmetries on the individual axes, but no drastic asymmetries either. The somewhat greater divergence on the determinism axis is due to the fact that the piece's overall course is precisely determined from a formal perspective, which gives rise to the higher value for the parameter "determinacy." As events on the level of detail depend more strongly upon random processes and the performers need to react precisely to these coincidences, "spontaneity" is more pronounced than "planning" for the parameter "spontaneity vs. planning," accordingly this value is somewhat lower. A further asymmetry is noticeable with regard to the agency axis. It is due to a similar state of affairs: for the parameter "performer vs. system agency," the predetermination of the work's overall form leads to a higher value for system agency. By contrast, the impression of creative leeway is comparatively high for the performers due to the many different possible actions on the level of detail, which to a significant extent derives from the possibility of moving freely within the virtual 3D space.

Strikingly, the diagrams of *To Kill Two Birds* and *game over* exhibit extreme values for individual parameters, and thus have a more jagged shape overall. By contrast, the diagram of *Kilgore* is dominated by median values, resulting in a "softer" overall shape. This shows that this is a system of analysis developed specifically for "GAPPP works" (for the definition of a GAPPP work see *Glossary*). The jagged form for *To Kill Two Birds* and *game over* tells us that these works diverge from the standard definition of a GAPPP work in at least one regard. In *To Kill Two Birds*, this






divergence consists of the fact that the "creative leeway" is very limited, an indirect result of the decision to design this work for audience participation. In *game over*, the divergence lies in the fact that the work dispenses with implementing rules, leading to minimum values on the ludus axis.

## 6. EVALUATION AND SUMMARY

As described above, applying the polar diagram leads to differently shaped diagrams for each analyzed work. These diagrams visualize some of the respective work's special features. In the case of *To Kill Two Birds With One Stone*, I showed that the distribution of parameters reflects the work's conception as a piece that can be realized by audience members. Reviewing the symmetries of the axes in *game over* and *Kilgore* revealed detailed characteristics of the link between the interface and the audiovisual system among other things. All in all, the system of analysis functions in that it enables the comparison of different works, highlighting differences and shared traits. Furthermore, it provides insight into some of the details that characterize the individual work in question.

However, as each parameter is defined based upon qualitative evaluations, there are no absolute criteria according to which the reference values for the individual parameters are selected. What is the benchmark when a high value is chosen for "creative leeway," for

example? Accordingly, the values supplied correspond to the subjective assessment of the person conducting the analysis.[8] In order to test the method described in this article, each member of our three-person research team independently analyzed three further pieces, which I will not describe further here, and subsequently compared the resultant diagrams. As anticipated, the results were different, although for two of these three works the resultant basic shapes were similar for all three researchers [Fig. 6]. For the third piece, however, the results were very different [Fig. 7]. Nevertheless, the method of analysis proved useful in this last case, too, because it provided us with precise points of reference for a subsequent discussion in which we were able to investigate the different assessments and evaluations more closely.

## 7. NOTES ON THE APPLICATION OF CATEGORIES IN THE CONTEXT OF ARTISTIC RESEARCH

The method presented here serves an analytical purpose, reducing complexity and isolating aspects considered to be relevant in our special context. Each system that uses categories such as this needs to be approached with a certain caution, for, as Geoffrey C. Bowker and Susan Leigh Star write in their book *Sorting Things Out—Classification and its Consequences*, "Each … category valorizes some point of view and silences another" (1999, p. 5). Accordingly, it is important that systems such as the one under discussion here are implemented critically, reviewing which aspects are possibly neglected or even overlooked by this analytical system for each analysis of an audiovisual composition. Then again, it is also important to note whether and if so, how such systems influence one's own artistic practice. This is particularly relevant in cases such as ours, which have taken place within an artistic research context where the researchers are also the practicing artists. For "[e]ven when people take classifications to be purely mental, or purely formal, they also mold their behavior to fit those conceptions" (Bowker and Star 1999, p. 59). This can be problematic if the analytical system causes those creating to—possibly subconsciously—align their decisions in such a way as to match the criteria of the system.

All the same, the method also has positive potential. After all, the selection of the parameters and their spatial disposition are the result of observing the works created as part of our project over a longer period of time. They do not necessarily blind us to other criteria; rather, they increase our sensitivity to and ability to evaluate other aspects that have proven to be particularly significant to our interests. If the method of analysis helps us to internalize a refined understanding and the ability to make differentiated distinctions that

8
Having said that,
I would contend that every analysis is subjectively influenced.
Of course some methods of analysis contain fixed definitions, such as
the relation between the dominant and the tonic.
As soon as the aim is to understand and describe more complex links
and contexts, however,
such objectifiable axioms merely form the starting point of analysis.
In my opinion, there is no such thing as objective analysis
in the field of music
and visual art.



then inform our artistic practice, this certainly should be seen as positive. After all, artistic research usually aims not only to gain a better understanding of the phenomena investigated—which is the goal of musicology, too—but also to change and develop the artistic practice associated with these phenomena. This method of analysis seeks to contribute to this endeavor, a contribution we hope will be shared by a larger interest group.

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