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A relational approach to understanding interactions in interactive art

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Chapter 5

Describing and Comparing More-than-Human Interaction

5.1 Introduction

Traditional interactive art has predominantly focused on the dynamic interaction between human participants and the technical systems within artworks, referred to as art systems. Alongside the development of human-computer interaction, there has been growing interest in developing interactive technologies to engage animals and other nonhuman organisms (Mancini, 2011)(McGrath, 2009)(van Eck & Lamers, 2013). These explorations not only signify the evolving landscape of interaction design but also suggest the potential benefits of enhancing interspecies relationships through playful interactions mediated by computational technologies (Fava et al., 2019a, 2019b).

Within the field of interactive art, artist researcher Alinta Krauth introduced the term *multispecies interactive art* to characterise a form of interactive art practice that involves both human and animal participants, with a specific focus on enrichment for the latter (Krauth, 2022b). The overarching goal is to actively contribute to alternative ways of relating to our nonhuman companions, thus expanding the field of interactive art in favour of a more-than-human turn. Building upon this idea of multispecies interactive art, here we introduce the term *more-than-human interactive art* to describe the interactive art practice that extends beyond traditional audience-artwork interaction by involving other nonhuman elements as participants.

Grounded in post-humanist philosophy, the more-than-human perspective challenges the anthropocentric worldview by acknowledging the agency and influence of nonhuman entities,

Introduction

spanning animals, plants, ecosystems, and even technological systems (Forlano, 2017)(Giaccardi & Redström, 2020). Consequently, more-than-human interactive art must recognise the significance of nonhuman participants in shaping the interactive experience. While these artworks may not always require human participation, our focus here is on those involving both human and nonhuman organisms. Despite the growing interest in such artworks and practices, there is a notable scarcity of studies that critically examine how interspecies interactions are shaped within instances of more-than-human interactive art. A thorough investigation of such relationships not only allows us to uncover fresh insights, but also to identify gaps or limitations in this field and point to directions for future research and creation.

In Chapter 2 and 3, we introduce the relational model and its accompanying web-based tool, the Relational Modelling Tool (RMT), designed to describe and visualise interactions in interactive art¹. In Chapter 4, we show that RMT is capable of modelling and analysing diverse forms of co-located interaction. An intriguing aspect of RMT and its underpinning relational model lies in their impartial treatment of various elements—whether human, nonhuman organism, or technical system. Therefore, we believe that it can also provide a valuable theoretical and practical tool for examining different forms of more-than-human interaction and interspecies relationships. By testing the effectiveness of RMT in describing and comparing more-than-human interactive artworks, we also aim to contribute to the methodological tools available to researchers interested in this field.

This chapter builds extensively on our prior publication in the *Leonardo Journal* (Xu, Lamers, van der Heide, & Verbeek, 2025). Here, we expand on the concept of more-than-human interaction by contextualising it within the wider domains of Animal-Computer Interaction (ACI), biotic games, and other related fields in interaction design.

The chapter is structured as follows: First, we provide a brief overview of the broader context of more-than-human interaction within relevant academic and practical discourses; Next, we introduce five selected artworks that exemplify diverse forms of more-than-human interaction between humans and nonhuman organisms—each artwork is described in detail, followed by a description developed using RMT; Building on these analyses, we present a comprehensive discussion of the insights gained into more-than-human interaction, given the similarities and differences observed across the selected artworks; Finally, we evaluate the effectiveness of RMT’s modelling capabilities in this context, reflecting on its strengths and identifying potential areas for improvement.

¹The latest version of RMT is accessible via: <https://modeltool.liacs.nl/>

5.2 Situating More-than-Human Interactive Art

Besides interactive art, there have been many attempts to extend the scope of interaction design beyond focusing solely on human users. ACI has underscored the importance of designing interactive technologies tailored to animals, whether as users or participants, with the aim of enhancing their well-being and enrichment (Mancini, 2011)(McGrath, 2009)(Fava et al., 2019a, 2019b). Examples of such applications include interactive installations for captive parrots (Gupfinger & Kaltenbrunner, 2019), video games designed for pets and their owners (Tan et al., 2008)(Noz & An, 2011), and video conferencing systems for domesticated parrots (Kleinberger et al., 2023). Beyond the focus on animal users, Kobayashi et al. have introduced the concept of Human-Computer-Biosphere Interaction (HCBI), which encompasses computer-mediated interactions between humans and elements of the biosphere, such as wild species and biological systems (Kobayashi et al., 2015)(Kobayashi et al., 2009).

Meanwhile, in the context of artistic and entertainment computing, there has always been explorations of incorporating biological systems—ranging from cells to plants, animals, and even entire ecosystems—into digital systems to generate behaviours, leading to the creation of hybrid biological-digital systems (van Eck & Lamers, 2013). Such hybrid systems have also been applied in the development of biotic games, which combines biological organisms or systems with video gaming to raise awareness and understanding of biological concepts in a playful, interactive way (Riedel-Kruse et al., 2011). However, we argue that a key distinction between more-than-human interaction and these hybrid systems and games lies in the role of nonhuman life forms. Instead of merely “incorporate” nonhuman organisms into digital systems or use them as components of game mechanisms, more-than-human interaction treats nonhuman organisms as significant, if not equal, participants in the interactive experience alongside humans.

By shifting the focus away from developing human-centred interactive technologies and systems, the developments in more-than-human interaction have opened up new possibilities for redefining the boundaries of interaction design, fostering more inclusive and equitable relationships between humans and nonhuman entities, and challenging anthropocentric biases in technology and art. This shift not only broadens the scope of interaction design to encompass a wider range of participants but also encourages a deeper consideration of the ethical, ecological, and social implications of creating interactive systems that engage with the more-than-human world.

Similarly, more-than-human interaction broadens the focus of audience-artwork interaction to include nonhuman elements—such as animals, plants, microorganisms, and biological systems—as (active) participants in the interaction. These interactions may occur between

nonhuman participants and art systems, between humans and nonhuman participants mediated by art systems, or between different nonhuman participants mediated by art systems. In this study, we focus specifically on more-than-human interactive art that involves both human and nonhuman organisms. By doing so, we aim to investigate how interspecies relationships are created and mediated within these artworks, as well as to identify potential biases in the ways the roles of humans and nonhumans are understood within these interactions.

5.3 Modelling Diverse More-than-Human Interaction

We selected five interactive artworks involving both human and nonhuman organisms for analysis. These artworks, ranging from interactive installations to interspecies games, were chosen for their intention to engage both groups as participants in the interactions. Each piece employs distinct approaches to shape interspecies relationships. We introduce each work individually in reverse chronological order by creation date and describe the more-than-human interaction within them using RMT.

5.3.1 *Mouse Coach* (2023) by Jiabao Li

Mouse Coach is a speculative artwork that lets the artist's pet mouse control her exercise routine (Li, 2023, 2024) (see Figure 5.1). Each time the mouse runs on the training wheel, the artist receives a notification prompting her to run herself. When she matches the mouse's running distance, the artwork rewards both participants with different prizes. In conventional owner-pet relationships, humans are typically responsible for setting exercise routines of their pets. However, *Mouse Coach* subverts these dynamics by empowering the mouse to control their owner's exercise routine. This alteration challenges the normative dynamics between humans and their pets, making the work an intriguing case for more-than-human interaction.

The detailed description of *Mouse Coach* can be accessed in this worksheet² and the visualisation is shown in Figure 5.2. Using RMT, we identify three element profiles: a pet mouse, a human, an art system. For the mouse, the key action it performs in the interaction is to run without any intention of participating. This action is captured by the art system, creating a direct public communication from the mouse to the art system and triggering it to send a notification to the human via a direct private communication. This reaction of the art system initiates the interaction and informs the human of the mouse's activity. Consequently, it also generates a mediated private communication from the mouse to the human via the art system. After receiving the private communication, the human participates in the interaction by also

²<https://modeltool.liacs.nl/?artwork=mouse>



Figure 5.1: Jiabao Li, *Mouse Coach*, 2023. Installation exhibition at IDFA Doclab 2024. (©Jiabao Li)

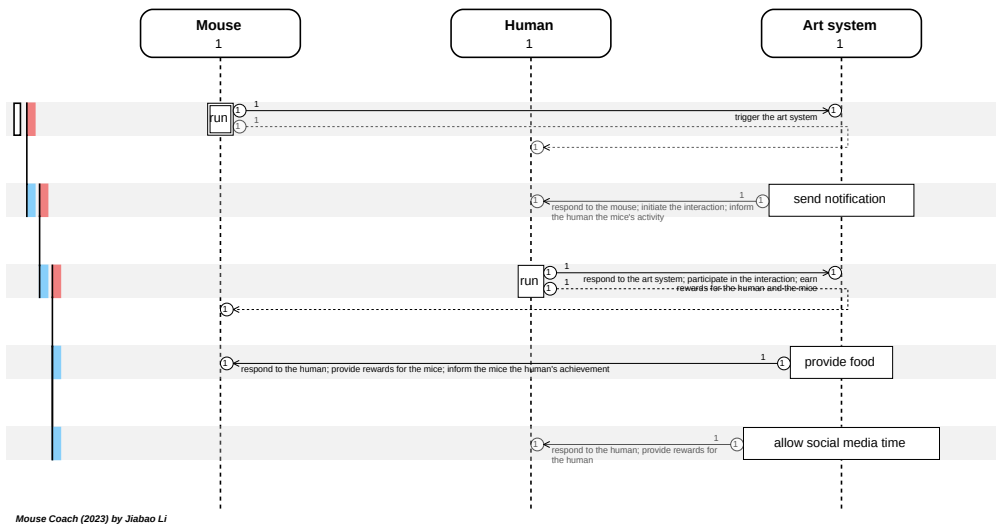
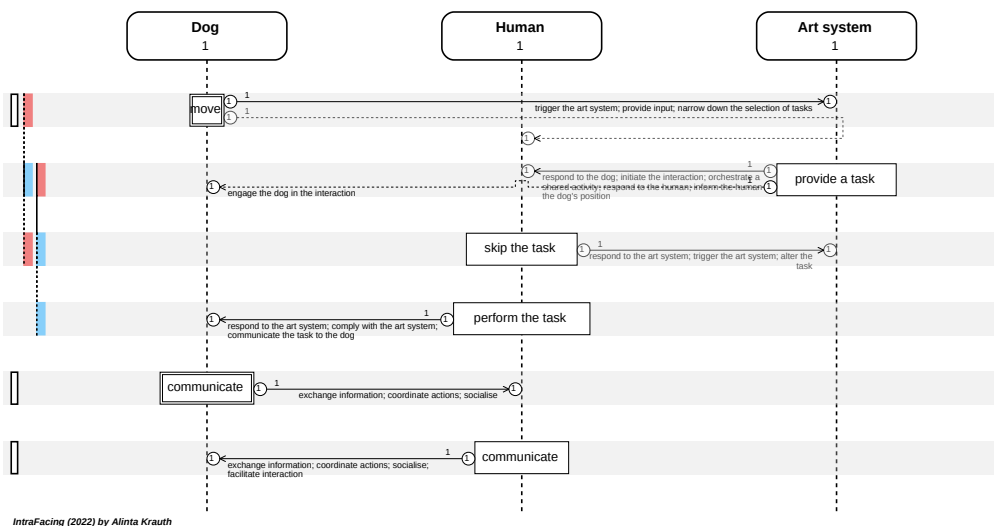


Figure 5.2: Visualisation of described interaction in *Mouse Coach* using RMT.

running. This action targets at the art system through a direct public communication, which triggers the art system to reward the human with time on social media and the mouse with food, while also informing the mouse of the human’s achievement. As a result, the successful interaction also generates a mediated public communication from the human to the mouse via the art system’s reward.

5.3.2 *IntraFacing* (2022) by Alinta Krauth

IntraFacing is a multispecies art game designed for humans and their companion dogs using a pair of mobile phones (Krauth, 2022a). One of the mobile phones detects the movement of the dog and sends a corresponding task to the human that instructs them to engage with the dog in playful ways, such as imitating the dog’s actions and expressions. Like *Mouse Coach*, the human and nonhuman participants share an existing owner-pet relationship. But unlike it, *IntraFacing* aims to enhance and enrich this relationship, rather than subvert its dynamics. Moreover, the pet owner and dog share the same physical space with direct access to each other. According to the artist, *IntraFacing* explicitly positions her pet dog as a co-contributor in the creative process, highlighting its significance in fostering more-than-human interaction (Krauth, 2020).



IntraFacing (2022) by Alinta Krauth

Figure 5.3: Visualisation of described interaction in *IntraFacing* using RMT.

The detailed description of *IntraFacing* can be accessed in this worksheet³ and the vi-

³<https://modeltool.liacs.nl/?artwork=intrafacing>

sualisation is shown in Figure 5.3. Using RMT, we identify three element profiles: a dog, a human, an art system. The key actions performed by the dog are moving and communicating to the human directly. We would argue that both are unintended for the interaction. When the dog moves, its body position is detected by the art system, resulting in a direct public communication that triggers the art system to provide a task to the human via a direct private communication. As the task is selected based on the detected position, it also provides input to the art system and narrows down the task selection.

By providing the task to the human, the art system initiates the interaction, informs the human of the dog's position, and orchestrates a shared activity for both participants. As a result, the art system also enables a mediated private communication from the dog to the human via this response.

In response, the human can either skip the task via a direct private communication to the art system, triggering it to provide another task and altering the task selection, or perform the task via a direct public communication to the dog, thereby complying with the art system and communicating the task to the dog. By performing the task, the human also enables a mediated public communication from the art system to the dog via their performance, thus allowing the art system to engage the dog in the interaction.

Finally, the dog and the human can communicate with each other directly and publicly as they share the same physical space. It allows them to exchange information, coordinate actions, and socialise. Note that for the human, this direct communication also facilitates their engagement with the dog in the interaction.

5.3.3 *Playful Rocksalt System* (2015) by Hiroki Kobayashi, et al.

Playful Rocksalt System enables real-time interaction between a human participant and wild deer in a remote forest through a sensing unit that detects a deer's presence, a rotating rock salt platform that attracts the deer, and a rotating camera (Kobayashi et al., 2015). Both the platform and the camera can be controlled remotely via a digital mobile device. Live video feed captured by the rotating camera is displayed on the same device. Although the work is not strictly created in an artistic context, we discuss it in this context because it aims to facilitate new forms of interspecies interaction. Unlike the above two artworks, it focuses on fostering new connections and relationships between humans and nonhuman organisms rather than altering preexisting ones.

The detailed description of *Playful Rocksalt System* can be accessed in this worksheet⁴ and the visualisation is shown in Figure 5.4. Using RMT, we identify three element profiles: a

⁴<https://modeltool.liacs.nl/?artwork=rocksalt>

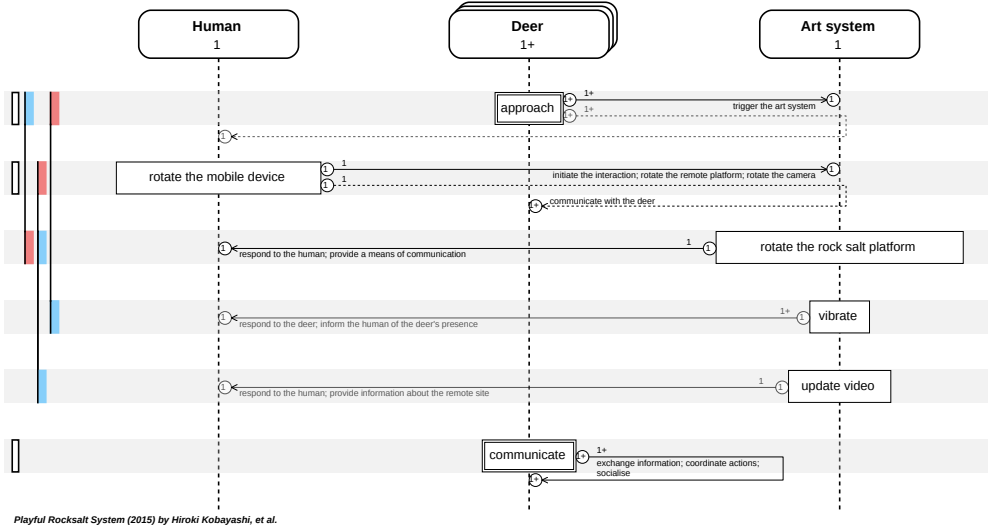


Figure 5.4: Visualisation of described interaction in *Playful Rocksalt System* using RMT.

human, one or more deer, an art system. The main action performed by the human is to rotate the mobile device, creating a direct public communication to the art system that allows them to initiate the interaction and control the rotation of the camera and the rock salt platform. In response, the art system updates the video to provide information about the remote site via a direct private communication to the human and rotates the rock salt platform to inform the deer of the human's action via a direct public communication to the deer. The movement of the platform also enables a mediated public communication from the human to the deer via the art system, allowing the human to attract and respond to the deer.

Meanwhile, one or more deer might approach the sensing unit and the rock salt platform, either voluntarily or being attracted by the rock salt, without any intention of interaction. However, their action is captured by the art system, resulting in a direct public communication that triggers the art system to send a vibratory notification to the human with the mobile device via a direct private communication. As a result, the art system also enables a mediated private communication from the deer to the human via this response. Furthermore, the deer can also communicate among themselves in a direct public communication to exchange information, coordinate actions, and socialise without intending to interact or contributing to the interaction.

5.3.4 *Encounters of a Domestic Nature* (2013) by Amy M. Youngs

Encounters of a Domestic Nature is an installation that facilitates interaction between crickets housed in a living bubble and humans in the same exhibition space through mediated visual access to each other (Youngs, 2013) (see Figure 5.5). As with *Playful Rocksalt System*, there are no preexisting relationships between the human and nonhuman participants. Like *IntraFacing*, both types of participants—humans and crickets—are located in the same physical space, allowing them to interact directly. While human and nonhuman participants in the previously discussed cases played distinctively asymmetrical roles and had different degrees of access to the art system, the art system here provides a symmetrical setup for both humans and crickets, potentially allowing for equal participation from both groups.



Figure 5.5: (left) The installation provides symmetrical setups for humans and crickets tailored to their respective scales. (right) Projection of miniaturized humans inside the crickets' living unit. (©Amy M. Youngs)

The detailed description of *Encounters of a Domestic Nature* can be accessed in this worksheet⁵ and the visualisation is shown in Figure 5.6. Using RMT, we identify three element profiles: one or more humans, one or more crickets, and an art system. The key actions of the crickets in the interaction are chirping and moving, which are unintended for the interaction but are captured by the art system. Each chirp generates a direct public communication to the art system that triggers it to update the landscape projected into the living bubble. This reaction of the art system generates a direct public communication to both the crickets and the humans, providing a visual background to the humans and a potential means of communication for the crickets. As this reaction is triggered by the crickets, it also enables a mediated public communication from the crickets to the humans via the art system.

⁵<https://modeltool.liacs.nl/?artwork=encounters>

Modelling Diverse More-than-Human Interaction

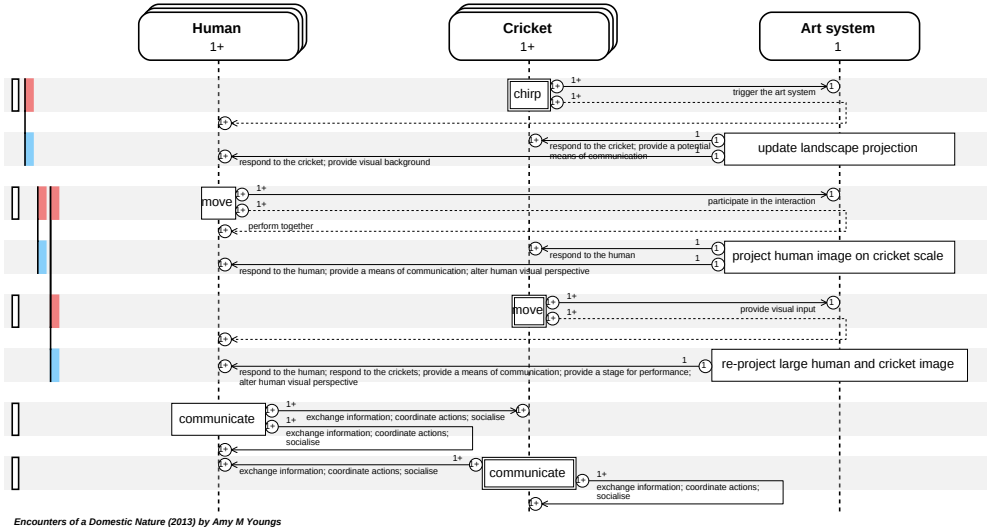


Figure 5.6: Visualisation of described interaction in *Encounters of a Domestic Nature* using RMT.

Meanwhile, the humans can move, which is captured by the art system via a direct public communication, allowing them to participate in the interaction. In response, the art system first projects a miniaturised human image into the crickets' living bubble. This action generates a direct public communication to both the crickets, although they may not be able to perceive or interpret the image, and the humans, altering their visual perspective and providing a means of communication for themselves and hypothetically to the crickets.

Moreover, the scenes within the living bubble, including the crickets, are captured by the art system in a direct public communication. The art system then re-projects the image of the crickets with the human projection at a larger scale into the exhibition space. This action generates both a direct public communication to the humans and a mediated public communication from the crickets to the humans, altering the human's visual perspective again and providing a means of communication and a public stage for the humans. Both reactions of the art system can help the humans communicate with each other and perform together through mediated public communication.

Being in the same physical space, the humans can communicate directly with each other and the crickets to exchange information, coordinate actions, and socialise. Similarly, the crickets can also communicate directly with each other and with the humans through actions like chirping and moving. Although these actions may contribute to the interaction, they may not be intended for participation.

5.3.5 *Myconnect* (2013) by Saša Spačal, Mirjan Švagelj and Anil Podgornik

Myconnect is an immersive installation that establishes a biofeedback loop between a human participant and a mycelium network by passing a human's heartbeat signal through the mycelium, translating the modulated signal into various kinds of sensory feedback, and delivering the translated signal back to the human (Spačal, 2013) (see Figure 5.7). In contrast to previous artworks involving animals and insects as participants, which are closer to humans in the animal kingdom, *Myconnect* introduces mycelium from the more distant fungi kingdom. The artists aim to establish a symbolic, symbiotic relationship between humans and mycelium that does not occur naturally, creating new interspecies dynamics with a more evolutionarily distinct nonhuman organism in an unusual context.



Figure 5.7: Saša Spačal, Mirjan Švagelj and Anil Podgornik, *Myconnect*, 2013. A human participant lies inside the installation. (©Saša Spačal)

The detailed description of *Myconnect* can be accessed in this worksheet⁶ and the visualisation is shown in Figure 5.8. Using RMT, we identify three element profiles: a human, a mycelium network, an art system. To initiate the interaction, the human connects to the heart-

⁶<https://modeltool.liacs.nl/?artwork=myconnect>

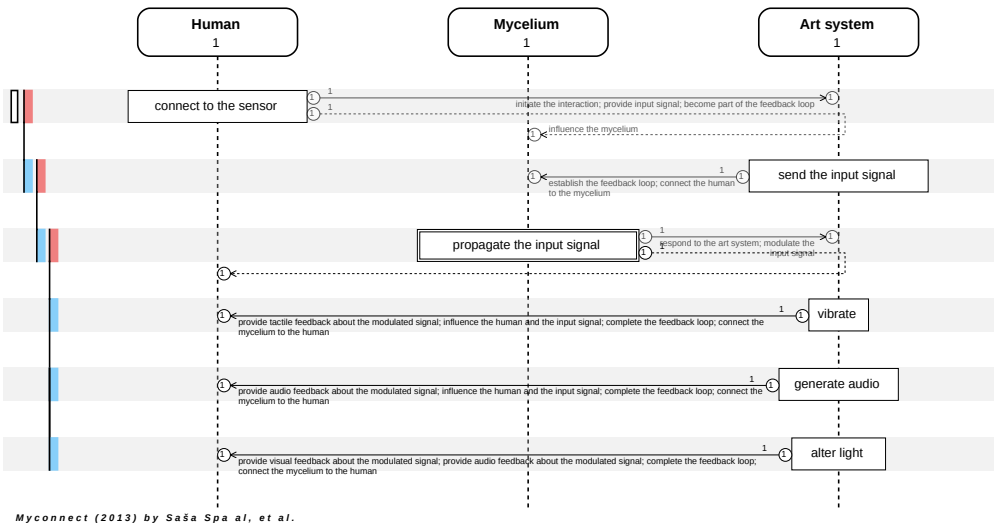


Figure 5.8: Visualisation of described interaction in *Myconnect* using RMT.

beat sensor to establish a direct private communication to the art system. This action allows them to provide an input signal and become part of a feedback loop with the mycelium.

The art system then sends the input signal to the mycelium via a direct private communication, connecting the human to the mycelium. Because of this reaction, a mediated private communication from the human to the mycelium is established, allowing the human to influence the mycelium. The mycelium then propagates and modulates the received signal back to the art system via a direct private communication as a natural response unintended for the interaction.

Upon receiving the modulated signal, the art system translates it into vibrations, audio, and changes in lighting that are communicated to the human; the modulated signal in the form of sensory feedback influences the human’s physiological processes, including their heartbeat, to complete the feedback loop. Each of these actions generates a direct public communication to the human. Through these responses of the art system, a mediated public communication from the mycelium to the human is realised.

5.4 Insights into More-than-Human Interaction

Based on the similarities and differences of the selected artworks, we have identified three themes that provide insights into the described more-than-human interactions.

5.4.1 Active versus passive participation

In the selected artworks, we observe a general trend in which humans take on an active role in the interaction, while nonhuman organisms play a passive one. When discussing the role of the audience in participatory art, Guljaeva (Guljaeva, 2018) discerns *active participation*, where the audience voluntarily interacts and is consciously aware of how their actions shape the artwork's output, from *passive participation*, wherein the audience may not intend to interact with and are unaware of their influence on the artwork. In the latter case, the art system often captures and selects audience input without explicit consent. Moreover, passive participation can become active when participants become aware of their impact and willingly choose to interact.

In all the described artworks, humans are aware of how their actions impact the interaction and participate voluntarily. In *Mouse Coach* and *IntraFacing*, while it seems that the art system directs the human participant, they can still choose whether to comply with the art system and determine how to carry out the interaction. In *Playful Rocksalt System* and *Encounters of a Domestic Nature*, humans can directly perceive the effects of their actions on the art system and consciously decide whether to participate.

Meanwhile, although the nonhuman participants in these cases often trigger the art system to initiate interaction, we would argue that these actions are not intended for participation, and they may not be aware of how they affect the interaction. Although they receive feedback about their actions either directly from the art system or indirectly via the humans' actions, it remains unclear whether they could eventually learn about the interaction mechanisms and become active participants.

On the other hand, *Myconnect* enrolls both the human and mycelium as passive participants with little control over their actions in the interaction. Although the human participant voluntarily connects to the art system, they do not have full control over their heartbeat under the influence of the sensory feedback provided by the art system. Meanwhile, the mycelium reacts to the art system based on their natural responses. Both participants become components of a bigger system—a biofeedback loop—realised through the art system.

For future inquiries, it may be interesting to explore ways to engage nonhuman organisms as active participants and consider scenarios where they interact with humans who participate passively. By shifting the dynamics of agency, we not only propose to explore new possibilities for interaction but also question the prevailing human-centric view of interaction. Achieving this requires effectively communicating the consequences and broader implications of the actions of nonhuman organisms and providing them options for participation, thus enabling them to make informed decisions about whether to participate and how.

It is worth noting that the selected artworks do not aim to educate the nonhuman organisms about the implications of their actions. Instead, they prompt the humans to consider the implications of the nonhumans' involvement. Moreover, since we lack direct access to the cognition of nonhuman organisms, assessing whether they have understood such implications remains speculative from a human standpoint. Clearly, such a proposal requires careful ethical consideration, as it inevitably necessitates humans interpreting the actions and responses of nonhuman organisms, especially those of plants and microorganisms.

5.4.2 Differing forms of mediated communication

In all described interactions, we observe various forms of mediated communication among the elements. Most prevalent is the communication from nonhuman organisms to humans via art systems: In *Mouse Coach*, *IntraFacing* and *Playful Rocksalt System*, the art systems detect the actions of the nonhuman organisms and inform the human participants with textual or vibratory notifications; in *Myconnect*, the art system translates the activities of the mycelium network into various sensory cues perceivable by the human; and in *Encounters of a Domestic Nature*, the art system presents live images of the crickets and humans to each respective group. Although these images are tailored to human visual modalities and therefore cannot be interpreted by crickets in the same manner as by humans, they nonetheless have an impact on the perceptual systems of the crickets. This artwork also allows human participants to communicate with each other via the live displays. In all these cases, the art systems actively relay information from the nonhumans to the humans without the former intending to do so.

The art systems also mediate another form of communication from humans to nonhuman organisms. This can take the form of food-based communication facilitated by the art system, as demonstrated by *Mouse Coach* and *Playful Rocksalt System*. Alternatively, the art system can translate human activities into physical stimuli that affect the nonhuman organisms, as is the case in *Myconnect*.

Additionally, an art system has the potential to serve as a medium for communication between nonhuman organisms. This is shown in *Encounters of a Domestic Nature*, where the art system responds to the chirping of crickets by updating the landscape projection that the crickets might use to communicate with each other. Although the projection is tailored to the human visual system, we speculate that the crickets could potentially learn and use this response as a signal for communication.

Although we use the term communication to describe the information flow from and to nonhuman organisms, we cannot infer their intention to communicate or their ability to interpret information as intended by other elements. In all the reviewed artworks, communications

with nonhuman organisms primarily rely on basic stimuli-response mechanisms orchestrated by art systems—with or without human involvement. We do believe that researching the different sense-making processes of nonhuman organisms and exploring alternative means of communication with them would benefit the development of more-than-human interaction.

One example of an alternative means of communicating with nonhumans is shown in *IntraFacing*: The art system communicates to the dog via the human's actions. Here, the human acts as an “interpreter” to convey the rules and contents of the game provided by the art system to the dog. They must engage in a dynamic and continuous exchange with the dog to ensure successful communication. This highlights the potential for harnessing human abilities and skills to communicate with nonhuman participants and for developing artificial systems that recognise communication as a contextual and ongoing exchange between two perceptive, dynamic entities.

Based on these discussions, we can envision new forms of communication by switching the roles of the elements. One distinctive form could be nonhuman organism-mediated communication, where humans and art systems use nonhuman organisms to communicate with each other. For instance, humans could train their companion animals to perform certain actions that are recognised by art systems, or art systems could influence the behaviours of nonhumans to convey information to humans. However, it is crucial to consider the consent of nonhuman organisms in these cases and avoid reducing them to mere tools—an ethical pitfall associated with utilitarianism.

5.4.3 Reconfiguring interspecies relationships

Art systems not only facilitate interspecies communication, but also reconfigure relationships between humans and nonhumans in various ways. First, they can create a collaborative context for both participants. As shown in *Mouse Coach* and *IntraFacing*, the art systems establish interdependence between both participants in accomplishing certain tasks. While in *Encounters of a Domestic Nature*, the art system provides a shared stage for humans and crickets, although the performance is primarily carried out by and presented to humans.

Alternatively, art systems can establish and mediate connections between humans and nonhumans. In *Playful Rocksalt System*, a deer's presence is translated into vibrations felt by the human, and the human remotely moves the rock salt presented to the deer. This mechanism allows both participants to engage in open-ended play and conversation. However, the human can also see the deer's reactions via the live display, while the deer's access to the human is restricted to the movement of the rock salt. In *Myconnect*, the human's heartbeat is transmitted to the mycelium network as electrical signals, and the activity of the mycelium network is

translated into multisensory cues presented to the human. The art system forcefully alters the physiological responses of both participants, restricting their agency to influence the process.

Art systems typically serve to facilitate communication and shape relationships between humans and nonhuman organisms because their focus has primarily centred on enrolling them as participants in interactive artworks. To further embrace the more-than-human perspective, we propose that art systems may also be considered participants themselves. This perspective unlocks new opportunities for creating interactions and prompts questions regarding the potential roles artificial systems might play in these scenarios: What forms of participation can they manifest? How might other elements, including humans and nonhumans, mediate and configure their communications and relationships with these systems?

5.5 Reflection on the Modelling Capability of RMT

As demonstrated in this chapter, RMT allows us to dissect the various forms of more-than-human interaction into the actions performed by the elements and the resulting various forms of communication among them. These terms provide concrete steps to specify how the elements influence and relate to each other, allowing for meaningful and systematic comparisons between interactions that might otherwise appear disparate.

As RMT treats humans, nonhuman organisms and art systems with equal terms, it allows us to view an interaction from the perspectives of all elements involved, including the nonhuman ones. In doing so, it becomes possible to identify the distinct roles played by each element on an equal footing and discern the interactive dynamics between them, for instance, whether an element is an active or passive participant. Furthermore, we can also envision new forms of interaction based on the terms specified by RMT and switching the roles of the elements.

Additionally, RMT enables easy identification and contextualisation of known interaction models within specific interactions. For instance, in *IntraFacing*, the art system first provides a task to the human participant, who can choose to skip the task which in turn triggers the art system to provide another one. This sequence can be identified as a feedback loop, which is a common interaction model in both interactive art and human-computer interaction (Bongers, 2000). The feedback loop is also easily identifiable in the visualisation, shown as the reverse symmetry of the blue and red bars in the conditions of both actions in Figure 5.3. Furthermore, the description using RMT situates such model within the broader context of the interaction, providing a more complete picture of how it relates to other actions and impact the elements.

5.6 Discussion

In this chapter, we apply RMT to systematically examine interactions in artworks involving both humans and nonhuman organisms. Our analysis reveals a recurring tendency to cast nonhuman organisms as passive participants and humans as active. Additionally, we identify various ways art systems mediate communications and (re)configure relationships between them. Taking a more-than-human perspective, we challenge these conceptions of element roles and propose directions for new forms of interaction that highlight the agency of nonhuman elements, including art systems.

The insights into more-than-human interaction discussed in this chapter hold significant potential for application in the development of other interactive systems beyond interactive art that aim to involve both human and nonhuman participants, particularly in fields such as ACI and related domains. Moreover, by demonstrating the capacity of RMT to analyse the behaviours of nonhuman participants and dissect the interactive dynamics within diverse forms of more-than-human interaction, we argue that it can serve as a valuable tool for evaluating the participation of nonhuman elements and identifying potential ethical pitfalls in the design and development of such systems. While this study focused on a limited selection of interspecies interactive artworks, we believe that RMT—and the analytical process it enables—can also be applied to study other forms of more-than-human interaction, such as interactive artworks involving exclusively nonhuman participants or non-organismic elements.

Through this study, we not only demonstrate the capability of RMT to model diverse interspecies interactive artworks, but also aim to provoke discussions on advancing interactive art beyond human-centric approaches. We hope this exploration inspires researchers and practitioners to consider alternative ways of interacting with and relating to the nonhuman world. At the same time, we encourage reflection on the broader implications of such endeavours, particularly in terms of ethical, ecological, and philosophical considerations.

Discussion
