EXPLORING THE UNCANNY: ETHICAL CASE STUDIES IN ARTIFICIAL BODIES WITHIN ROBOTIC ART AND PERFORMANCE

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Abstract: This paper examines the ethical implications of artificial limbs within the robotic art and performance framework, utilizing Kantian and Virtue ethics as analytical lenses. It begins by juxtaposing the concept of 'The Uncanny' with Post-humanism theory to discuss and compare three seminal works —Requiem (Roca, 1999), Inferno (Demers & Vorn, 2015), and Uncanny Valley (Keegi & Melle, 2023). These three study cases intersect technology and artistry, considering the body modification issue and the uncanny feeling that arises from altering or modifying the representation of the human body during performance. Therefore, ethical consideration naturally emerges to illuminate the responsibilities of artists and technologists in shaping the experiences of both the audience and participants. Thus, this discussion can contribute to the broader discourse on the ethical use of artificial elements in contemporary art.

Keywords: Artificial Bodies; Embedded Ethics; Robotic Art; Robotic Performance; The Uncanny Valley

INTRODUCTION

Venturing through the Uncanny: Blurring boundaries of human and machine

Imagine for a moment the following scenario: Inside a dimly lit room transformed into a small theater, we wait in anticipation of what lies beyond the dark stage in front of the audience's rows. The producer at the back of the room gives signals to the crew. As the light fades, an enthusiastic buzz dies into a hushed silence. At the center of the stage, a face gradually emerges from the darkness[1]. Under the spotlight, a man sits in an armchair, his posture unnaturally rigid. There is something uncanny and peculiar about him. After a prolonged silence, the man on the stage turns to us and begins to speak his voice sounds quite human, yet an odd synthetic quality underlies it.

Image 1. An animatronic, a representation of Thomas Melle, during the Uncanny Valley performance at the Ars Electronica Festival, September 10, 2023. The photo was taken after due to restriction of taking image during the performance. Image source : Author's documentation.

Despite the scene described in the previous paragraph may seem like science fiction, it is, in fact, a real performance from the opening act of the *Uncanny Valley*

1 Freud (2017, p.241) associates the 'uncanny' (*unheimlich*) with something that was meant to remain hidden or repressed but has unexpectedly surfaced. This concept is key to his understanding of the uncanny. (Cinderakasih, 2023, p.165)

at the 2023 Ars Electronica Festival[2]. The animatronic[3] on stage represents the artificial body of German author Thomas Melle, who has a laptop on the coffee table beside him, from which the presentation behind him during the performance comes. The audience cannot help but feel a mix of fascination and discomfort, seeing his human like features combined with a carefully choreographed mechanical hand gesture. A performance like the *Uncanny Valley*, which merges the organic and artificial, evokes the need to get closer to the heart of the uncanny and confronts our perception of human identity. It helps to provoke our concern about the ethical dimension of technology's role in reshaping the human body. Throughout the performance, the question confronts us: *Where does humanity begin and technology end?*

As technology becomes more incorporated into every aspect of our daily lives, practitioners and theorists share concerns about this advanced technology's impact on autonomy, embodiment, and humanity. A notable post-human theorist, Donna Haraway (1987, p.33), refers to this issue in her *Cyborg Manifesto* and addresses the blending of man and machine to reconstruct our traditional notions of identity and embodiment. Artificial limbs, prostheses, and wearable technology like hearing aids and fitness trackers have blurred the physical and digital boundaries, leading to a complex concept of self and our interaction with the world. Therefore, redefining the limits of the ethical boundaries of artificial augmentation in human body representation is necessary (Cinderakasih, 2023, p.23). The uncanny sentiment that these developments in regard to the post-human body evoke is perhaps an innate alarm for humanity to re-evaluate our reliance on technology and its integration into the human body.

This paper focuses on three key performances *Requiem* (Roca, 1999), *Inferno* (Demers & Vorn, 2015), and the *Uncanny Valley* (Keegi & Melle, 2023), that explore the relationship between 'The Uncanny' and Post-humanism theory within the artistic practice of each piece. It further discusses the ethical implications of artificial limbs using two ethics theories as an analytical lens Kantian ethics, which tries to preserve human autonomy and Virtue ethics, which views technological integration as an opportunity for human flourishing. By examining these artworks and the given ethical frameworks, this paper encourages deeper consideration of technological advancement, humanity, and ethics in our contemporary society.

2 Ars Electronica Festival, an annual art and technology event in Linz, Austria, was founded in 1979 by innovators Herbert W. Franke, Hubert Bognermayr, Ulli A. Rützel, and Hannes Leopoldseder. The festival aims to explore the intersections between art, technology, and society in light of the Digital Revolution. Author went to the Ars Electronica Festival 2023 to exhibit her project as a part of her study.

3 Merriam-Webster. (n.d.). Animatronic. In Merriam-Webster.com dictionary. Retrieved September 17, 2024, from https://www.merriam-webster.com/dictionary/animatronic

THEORETICAL STUDY

The Uncanny Valley

The concept of the uncanny was introduced in 1919 by Sigmund Freud. The term 'uncanny' originated from the German word, *das unheimlich*. Schelling, a German philosopher, used it in his literature to describe something intended *'to remain hidden but that has come to light'* (Freud at. al., 1976, p.634). Freud describes the uncanny as the unsettling sensation that emerges when something simultaneously becomes familiar and unfamiliar (Freud, 2017, p.220). Additionally, according to Fenichel (2018, p.16), this phenomenon blurs the boundary between reality and fantasy. Its ambiguity makes the observer experience psychological ambivalence, cognitive dissonance, and discomfort. And yet, it creates both attraction and repulsion toward one who experiences it. As Fenichel (2018, p.15-16) later expands in her dissertation, the uncanny has evolved into a deliberate choice for artistic creation. The tension between the familiar and the unfamiliar evokes reflection and emotional engagement, especially in robotic art that challenges the human and machine boundary.

In comparison, Masahiro Mori's essay in 1917 *Bukimi no tani genshō* introduced the concept of the Uncanny Valley, later translated into English by MacDorman (Mersch, 2023, p.156). Although 'valley' does not appear in the literal translation, the term reflects Mori's depiction of the sudden drop in emotional comfort and human affinity towards realistic-looking robots (Mori et al., 2012, p.98; Broad et al., 2022, p.36). This sudden dip occurs because the human brain expects perfect alignment between appearance and nature. An artificial figure, such as a humanoid robot, prosthetic limb, or digital avatar, which closely resembles a human on many occasions still exhibits slight mechanical or unnatural movements. This condition can trigger a cognitive dissonance similar to Freud's' uncanny. The dissonance initiates feelings of unease, eeriness, or even revulsion that reflect our discomfort. This phenomenon become a central concern regarding the technological development of the robotic and artificial body. The robotic art and performance often explore this region as an artistic pursuit.

In works such as The Uncanny Valley (Keegi & Melle, 2023), this phenomenon is intentionally used to challenge the audience's perception of a sense of self. Replacing the absence of human performance with the lifelike qualities of the animatronic figure might be intentionally chosen to introduce discomfort among the audience, bringing up ethical challenges where boundaries between people and machines become unclear. This inevitable confrontation compels the audience to rethink traditional notions of identity, autonomy, and control.

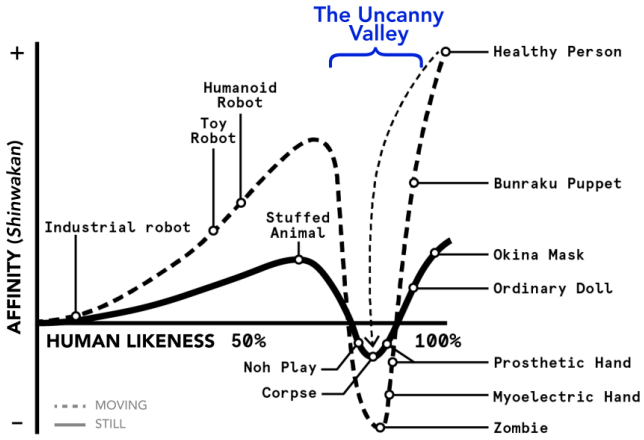

Image 2. The graphic illustrates Mori's thesis, The Uncanny Valley, by comparing the appearance of realistic-looking robots with human affinity for them. The image is reproduced from Mori's essay (2012, p. 99, illus).

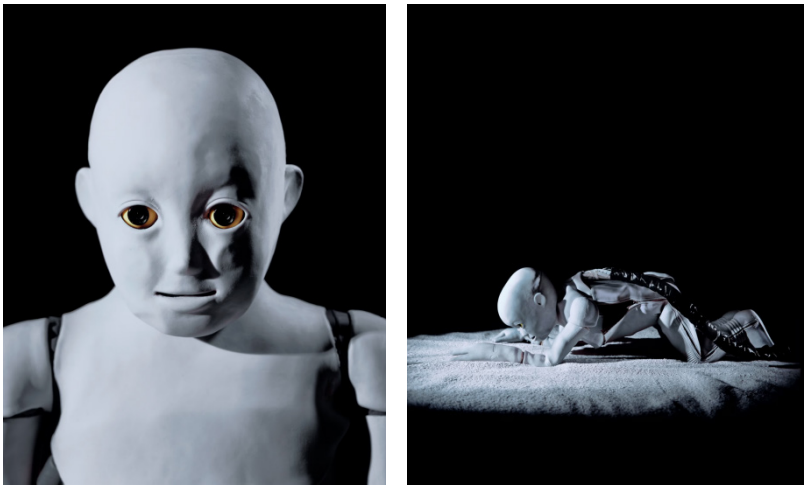

Image 3. A 2010 robot is designed to appear childlike. Photograph by Max Aguilera-Hellweg, Nat Geo Image Collection. Image source : https://www.nationalgeographic.com/science/article/ai-uncanny-valley

What's Come to the Light in Post-humanism

In contrast to the Uncanny Valley theory, post-humanism, which lies at the core of contemporary robotic art and the integration of artificial limbs, challenges and celebrates the blurring boundaries between humans and machines. Haraway's idea of post-humanism (1987, p. 7-8) rejects the concept of the human as a fixed entity. Artificial limbs become a common (Poster, 2002, p. 15). Prosthetics and organ augmentation have turned widely accessible, not only as a medical

intervention to replace damaged or malfunctioning body parts but also as a tool for aesthetic and artistic expression (Cinderakasih, 2023, p. 75).

Post-humanism has opened up possibilities for self-redefinition and the deconstruction of identity beyond biological determinism, such as traditional gender, racial, and class boundaries (Haraway, 1987, p. 2-3; Kroker, 2012, p. 4-5; Pitts, 2002, p. 152-154). However, what lurks behind this optimistic vision of post-humanism raises varied ethical concerns. The discomfort and unease from the blurred boundaries between human and technological augmentation can arouse fears of dehumanization and the potential loss of agency rather than purely empowerment. If the boundaries dissolve, what remains from the traditional notion of the human body? Moreover, can individuals retain autonomy under the scrutiny of the technologically augmented world?

In robotic art and performance, the tension between empowerment and dehumanization is often used as a drive to artistic explorations. Works such as Requiem (Roca, 1999) and Inferno (Demers & Vorn, 2015) explore the idea of artificial limbs integration into performance art to enhance autonomy or diminish the performer's control. These two projects illustrate how the fusion of humans and machines in robotic art performances challenges traditional concepts of freedom and autonomy. The human performers often need to wear or connect with mechanical apparatuses that determine their movements.

DISCUSSION

Robotic Art and Performance: Requiem (Roca, 1999), Inferno (Demers & Vorn, 2016), dan Uncanny Valley (Keegi & Melle, 2023)

The growing influence of digital culture and advanced technology in contemporary art and performance has become an unavoidable phenomenon. Although the genre of robotic art and cyborg performance remains relatively new and experimental, it offers alternative ways of experiencing art (Boy1aTζάκη-Krukowski, 2019, p.129-130). This type of performance confronts traditional notions of corporeality, human autonomy, and technological control. For artists, artificial limbs augmentation in robotic art plays in the boundary of human physicality and embodiment. In this context, technology becomes a tool for exploration that helps to expand the possibilities of artistic expression in ways previously unattainable in traditional performance art. It provides a platform to explore new modes of movement, expression, and interaction on stage. Both performers and audiences in different ways, can experience the limits of human agency and the potential of technological augmentation in the creative process.

The *Requiem* (1999) project by Marcel·lí Antúnez Roca is a notable example of how robotic art can push these boundaries. Roca has designed the performance aboard the zero-gravity aircraft Ilyushin at the Yuri Gagarin Training Center. This performance uses Roca's *Systematugy* framework with his innovative *Dresskeleton* interfaces (Şangüder, 2016, p. 13). *Systematugy* integrates real-time control of robotic elements, sound, and visuals with an interactive feedback loop system. The *Dresskeleton* interface is a robotic exoskeleton worn by the performer, allowing the body to be controlled by mechanical or digital elements during the performance (Roca, 2003). The performer, suspended in zero gravity, must synchronize their movements with a pre-programmed choreography. This interaction underlines the tension between performer autonomy and technological control over the *Dresskeleton*. The visual expression of the performer often disconnects from the physical cue provided by the machine-driven movement and body restriction. In this project, the unsettling interplay between autonomy and technological control in robotic performance becomes apparent.

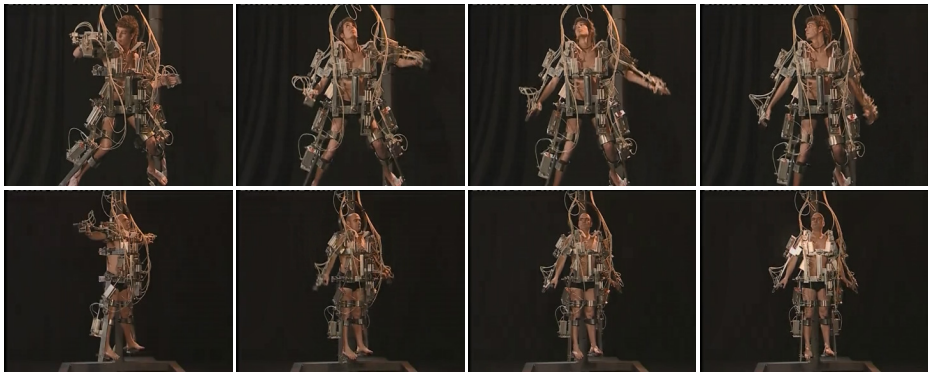

Image 4. Requiem (1999) by Marcel·lí Antúnez Roca. Image source: Extracted from the project video. Retrieved October 15, 2024 https://www.marceliantunez.com/work/requiem/.

The built theme of Louis-Philippe Demers and Bill Vorn's *Inferno* (2016) is similar to *Requiem* (Roca, 1999). Both projects explore the boundaries of corporeality and technological control. However, Inferno is designed to create a more immersive for both participants and the audience. According to Βογιατζάκη-Krukowski (2019, p.7), technological augmentation in performance has transformed traditional dynamics on stage, enabling a fluid exchange of roles between performer and audience, thereby fostering a more immersive and participatory experience. Inferno, first performed at the BIAN – International Digital Art Biennial in Montreal invites untrained participants to wear robotic exoskeletons. These exoskeletons control the participants' upper bodies in sync with a choreography set to techno-industrial music. In contrast to the previous

project, *Inferno* allows the participant to alternate between moments of free movement and periods where the machines control their responses (Joacum et. al., 2018, p. 3). As a result, participants experienced an unsettling balance between freedom and submission within the performance.

Image 5. Inferno (2016) by Louis-Philippe Demers and Bill Vorn.
Extracted from the project video. Retrieved October 15, 2024 from Youtube.
https://youtu.be/3JICV-aOMFI

In contrast with *Requiem* (Roca, 1999) and *Inferno* (Demers & Vorn, 2016), *Uncanny Valley* (Keegi & Melle, 2023) adopts a more traditional theatrical framework. It has a conventional setup where the audience remains seated passively, and the performer—a whole-body prosthetic robot of German writer Thomas Melle's double embodies him in his absence—delivers a scripted lecture. Unlike the physically immersive nature of Requiem and Inferno, Kaegi's work operates on a conceptual level. The performance theme focuses on the psychological impact of an entirely artificial performer as Kaegi describes it as a *'dramaturgical state of mind'* (Pluta, 2020, p. 700). In this context, the technological integration though artificial limbs body doubles in performance raises questions about identity, authenticity, and the role of machines in artistic expression (Medenica, 2021, p. 102).

Image 6. Uncanny Valley (Keegi & Melle, 2023).
Image source: https://www.rimini-protokoll.de/website/en/project/unheimliches-tal-uncanny-valley

All three projects described above have significantly contributed to the post-humanism discourse, especially in robotic art and performance. Technological augmentation assists and drives the artistic creation, exploring the boundary of human and machine integration. *Requiem* (Roca, 1999) and *Inferno* (Demers & Vorn, 2016) play on the physical consequences of robotic control over the performer's body. Corporeal experience drives between submission to the choreography and freedom of movement, illustrating a broader context of empowerment and reliance on technology. On the other hand, *Uncanny Valley* (Keegi & Melle, 2023) examines the psychological and philosophical dimensions caused by the animatronic presence on stage. It tries to explore the fluid understanding of self-identity and authenticity altered by technology integration.

In addition, each of the projects mentioned before presents the uncanny in different aspects of the performance. In that case, *Requiem* explicitly shows the discomfort caused by the fully controlled body movement under the skin of *Dresskeleton*, while *Inferno* provides a space for freedom of movement to some extent, the performer turns to submit to the choreography. Both projects embody this struggle for bodily autonomy in the physical realm. Besides, *Uncanny Valley* emphasizes the uncanny feeling of witnessing the fusion of artificial intelligence and human expression within a more familiar theatrical setting. It adds another layer to the artistic exploration of identity and authenticity in technology-mediated performance.

Uncanny Shadow through the Lens of Kantian Ethics

Autonomy, an individual's capacity to act following their own rational will, becomes the central concept of Kantian ethics (Kant, 1988, p. 192-194). Kant views rationality as an inherent quality of every individual. Moral motivations should be free from external constraints; thus, individuals deserve to be treated with respect as an end in themselves (Wood, 2008, p.158-159). This notion of human dignity is grounded in the belief that every individual should not be regarded as a tool or instrument because of their own worth and the worth of others. Consequently, the individual agency becomes essential to Kantian ethics.

From the three study cases, both *Requiem* (Roca, 1999) and *Inferno* (Demers & Vorn, 2015) explicitly utilize artificial bodies and technological augmentation as part of artistic exploration while also gaining experimentation on the bodily experience. Even though there are attempts to expand the embodiment and experience in both performances, the performers wear exoskeletons that

Table 1. Comparative study on Freud's Uncanny / Mori's Uncanny Valley theory and Haraway's Posthumanism on three projects; 1) Requiem, 2) Inferno, and 3) The Uncanny Valley

		REQUIEM (ROCA, 1999)	*INFERNO (DEMERS & VORN, 2016)*	*THE UNCANNY VALLEY (KAEGI & MELLE, 2023)*
FREUD'S UNCANNY / UNCANNY VALLEY THEORY	**1. Technological control - disruption of body autonomy**	a. Human as a site of experimentation b. Exoskeleton exerts control over human movement c. The pre-programmed choreography imposed by the exoskeleton forces the performer to relinquish their autonomy, raising critical questions about the balance between human agency and mechanical control	a. Upper-body exoskeletons forces performer to follow pre-programmed movements b. The amount of immersion & syncronization in the project diminish the performer agency	a. The audience is confronted with the animatronic double of Thomas Melle,challenging their sense of autonomy in perceiving what is real and artificial b. The audience confronts the control machines exert over human identity and presence on stage
	2. Emotional discomfort	a. Tension between human will and the demands of the exoskeleton b. A sense of discomfort experience from the loss of control as they need to move along the pre-programmed choreography	a. Unsettling dynamics of control and submission within the performance b. Performers must navigate the experience of their bodies being controlled by the exoskeleton, requiring a surrender to the choreography to render the experience more bearable and enjoyable	a. The contrast between Melle's personal narrative and the mechanical nature of the animatronic generates a complex emotional response b. The performance evokes emotional discomfort as the audience observing Melle's animatronic likeness but lacks human essence.
	3. Question of identity	a. The performer's body transformation into a mechanized extension b. A reliance on the technology, raising questions about the balance between human control and mechanical assistance	a. Participants submit to the exoskeleton's control but retain the option to resist (by not dancing along the tecno-music) or engage with the performance (by syncronizing their movement) b. Participants in Inferno must confront their physical self-perception while their bodies are controlled by the exoskeleton	a. Challenges on traditional notions of identity by presenting a robot that not only mimics but seemingly replaces the human presence b. Deeper reflections on identity and authenticity, raising questions about the nature of self identity in an era of artificial intelligence
HARAWAY'S POST-HUMANISM	**1. Blurring of Human-Machine Boundaries**	a. The integration of the robotic exoskeleton transforms the performer into a hybrid of human and machine b. Presenting the post-human figure as one that operates through both biological and mechanical systems	a. Robotic exoskeletons merging human and machine, transforming the body into a technological entity b. As participants' movements are dictated by the exoskeleton, creating a hybrid form that blurs the boundaries of physical agency	a. The animatronic double of Thomas Melle exemplifies the machine as a human replica/replacement b. Pushing the audience to confront a post-human reality where machines mimic human characteristics, blurring the lines between the organic and artificial
	2. Embracing Complexity and Fluidity	a. Exploring the fluidity of the human body as it adapts to mechanical augmentation b. Dynamic shift in response to technological influence	a. Participants alternate between moments of control and submission to the pre-programmed choreography b. Allowing participants to either engage with or resist the mechanical movements c. Complex relationship between freedom and constraint, showcasing how the human body can fluidly shift between autonomy and dependence on technology	a. The performance intertwines Melle's personal narrative with the robotic representation, exploring the fluidity of identity in a world shaped by technological interaction b. Dynamic selfhood, continuously shaped by digital and mechanical forces
	3. Empowerment and dependence	a. The exoskeleton enhances the performer's ability to engage in complex movements beyond the body's natural capabilities b. The realization upon control of the machine, raising questions about the balance between liberation and subjugation in the human-machine relationship	a. A sense of dependence on the machine & the extent to which technology liberates or controls b. Participants must negotiate their agency within the constraints of the mechanical system	a. Extension of Thomas Melle's presence beyond physical constraints b. Dependence on technology to convey authenticity

restrain and partially control their movement, compromising their autonomy through pre-programmable choreography. The uncanny feeling that then arises comes from the artificial limbs integrated into the performer's body concerning power dynamics and thus becoming an external constraint to their agency. In this context, the post-human body stands in contrast to Kantian ethics.

The previous two projects, *Requiem* (Roca, 1999) and *Inferno* (Demers & Vorn, 2015), explore the constraints of technology on autonomy. On the contrary, *Uncanny Valley* (Kaegi & Melle, 2023) delves more into the implications of technology on identity and authenticity. Throughout the performance, complex emotional responses to the absence of the actual person arise in the presence of the animatronic, a body double of the original performer. It gives a glimpse of the idea that technology can easily replace or alter a new definition of existence. In this sense, Kantian ethics provide insight into this exploration, whether it can enhance one's autonomy or simply reduce humans to mere instruments in a mediated world.

Virtue of the Post-Humanism: Self-expression and Exploration

Unlike Kantian ethics which emphasizes autonomy and universal moral principles, virtue ethics mainly concerns developing moral character and pursuing human flourishing (eudaimonia) (Hursthouse, 2017, p.29-30; Nagel, 1981, p.7). Doris (1998, p. 505-506) argues that individuals, seeing from a virtue ethics perspective, might still have a reliable behavioral manifestation even though they are in the most complicated situation. Although the Kantian ethics perspective considers post-humanism as a threat to human autonomy, virtue ethics views technological advancement, such as artificial limb augmentation, provides an opportunity to cultivate new values, such as creativity, resilience, and self-expression. Thus, this technological integration becomes a pathway to human flourishing. Individuals can explore new modes of being, thinking, and interacting with the world in ways that expand traditional notions of identity.

In the first study case, *Requiem* (Roca, 1999) simulates how the augmentation of a full-body exoskeleton pushes the performer to exceed the natural limitation of the human body. Even though the wearable restricts the human body movement, it also pushes the performer's ability to practice resilience and synchronize with the choreography movement. Similarly to *Inferno* (Demers & Vorn, 2015), the upper-torso robotic suit provides more freedom in exploring the human body movement throughout the synchronization. During the performance, the performer navigates between submission to the choreography and freedom to resist or cherish the experience. From a virtue ethics perspective, autonomy becomes a freedom of choice and self-expression. This fusion of technological

augmentation fosters the creativity that redefines the relationship between body and technology. The artist and technologist work in this artistic region to construct a new embodiment experience for the performer and audiences.

Moreover, *Uncanny Valley*'s (Kaegi & Melle, 2023) performance invites the audience to confront the presence of an artificial body that challenges the normative value of human identity and authenticity. Kantian ethics see the technology that enables the extension of human existence despite the absence of organic bodies might dehumanize our identity. However, virtue ethics embraces and encourages this technological augmentation exploration for a sense of purpose and artistic expression. This attitude provides courage and adaptability for individuals to face the challenges of blurring boundaries between humans and machines, pushing humanity for the progression to the future.

CONCLUSION

Embracing the Uncanny: Considering the Ethical Implication of Artificial Limbs Augmentation in Robotic Art and Performance

This paper tries to examine the use of artificial limb augmentation in robotic art and performance, exploring case studies Requiem (Roca, 1999), Inferno (Demers & Vorn, 2015), and Uncanny Valley (Kaegi & Melle, 2023). Post-humanism concepts celebrate bodily augmentation to extend human limitations. Enhancements, such as prostheses and smart devices, can provide more inclusivity and enhance the natural features of the human body. On the other hand, the 'Uncanny' theory gives insights into the tension surrounding human autonomy brought about by this technological integration. Each project above explores this tension as a drive for artistic expression, raising ethical concerns reflecting on human identity, autonomy, and the meaning of the sense of self. Thus, the exploration of this topic through art and performance cannot overlook the dualism of technological advancement that becomes more apparent as it progresses.

Thus, this topic exploration through art and performance cannot overlook th e dualism of technological advancement that becomes more apparent as it progresses. Kantian and Virtue ethics can be a moral guide to navigating these complex landscapes. The uncanny feeling creates an ethical need to preserve autonomy and human dignity, which aligns with Kantian ethical values. Meanwhile, the post-humanism perspective encourages embracing the empowerment that comes with technological augmentation and letting virtue ethics become a guide to promote adaptability, creativity, and human flourishing. As we move toward a more cybernetic future, exploration of

Jizai Arm, an artificial limb that co-create choreographic dance responding to the performer. Image source: https://newatlas.com/robotics/jizai-arms-supernumerary-robotic-arm-system/

Image 7. Examples of how the positive intakes on technology augmentation can promote a creativity virtue.

Sougwen painting with a robotic arm. Image source: https://www.washingtonpost.com/business/2020/11/05/ai-artificial-intelligence-art-sougwen-chung/

technological advancement in artistic practice is one of many ways to raise our concern about the evolving nature of human identity and autonomy in a world shaped by technology.

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