

Who's Afraid of Virtual Humans?

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Abstract. This paper addresses the uncanny valley effect of humanoids from a gender studies perspective. On that account it suggests to link the construction of the human-computer interface to the construction of the cultural order of the two genders. This connection is derived from a rereading of the Turing test. A semiotic view on computer science serves as epistemological grounding of the analysis. The special character of technological artefacts is discussed by taking Freud's concept of "Das Unheimliche", as well as theories of identity formation into consideration, in order to answer the question: Why do humans fear their virtual counterparts?

1 VALLEYS AND GAPS

1.1 Between Life and Death

In 1970 roboticist Masahiro Mori published his theory on how humans react emotionally to artificial beings [1]. According to Mori, the role model of robotics is the human. In a graphic he links the trustworthiness of the artefact to its human resemblance.

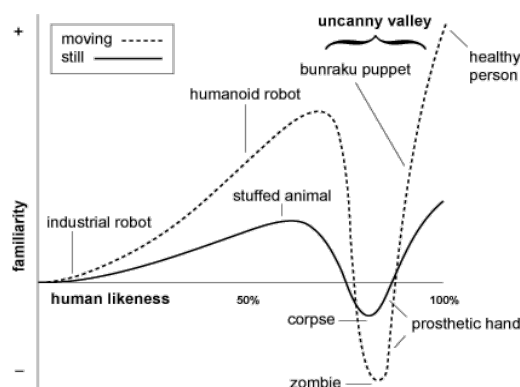


Figure 1. The Uncanny Valley

As the figure shows, human likeness evokes trust only up to a certain point. If the robot comes very close to appearing human, but of course *is not quite the real thing*, minor lapses will produce irritations. On its way to reach the peak of humaneness the robot falls into the depths of the uncanny valley.

The starting point for Mori's considerations are industrial robots, who simulate certain human actions but not human appearance. Adding to this, he differentiates between mobile and immobile objects. Especially the ability to move autonomously contributes to the lifelikeness of the artefact, but it also adds to its potential creepiness. Most interesting, the uncanny valley

addresses matters of life and death. Even more scary than those who actually are dead, appear to be the beings that are situated between the two discrete states: In the abyss, zombies and other undead creatures lurk - the deepest point of the valley is inhabited by those who are neither dead nor alive. Mori illustrates this ambiguity by using the example of a prosthetic hand. When the artefact *looks* like a healthy human hand, but *feels* cold and alien when touched, it may be experienced as slightly disturbing at the least, and as horrifying at the worst. The prosthetic hand can be unsettling precisely because it invokes an encounter with the *living dead*. According to this, the uncanny is triggered because of the discrepancy between *looking at* and *touching of* the object.

A further-reaching discussion of the uncanny valley effect is lacking in Mori's paper. Still, he wonders: "Why do we humans have such a feeling of strangeness? Is this necessary?". As a roboticist his perspective is application-oriented. For the design process of anthropomorphic robots he advises to go for the first peak shown in the graphic, but not further. This means, the design of the artificial being accepts a cut back on lifelikeness, but avoids stumbling into the uncanny valley.

1.2 Material-Semiotic Embodiments - Closing the Gap?

1.2.1. Robots and Virtual Humans

Mori's concept is discussed controversially; it has been considered non-scientific [2] and questionable [3] or served as inspiration [4]. Even if not addressed explicitly, the *Uncanny* [5] always plays a role when it comes to the design of artificial beings. It serves as a nodal point for the acceptance and the overall impact of artificial beings, such as humanoid robots, embodied interface agents, computer game figures or avatars. Human characters in animation films, for example, are often considered to fall into the uncanny valley when they are designed to achieve a very realistic appearance¹. Successful movies, in contrast, tend to employ more cartoon-like features in order to avoid the effect². Instead of aiming at copying the real world an aesthetic of their own gets created.

In social robotics, there exists a variety of forms of embodiment. When it comes to the uncanny valley especially the *Actroids*³, lifelike humanoid robots that are designed to explore and challenge the effect, are worth mentioning. With their silicon body and respiratory sounds they try to achieve what is

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¹Cp. e.g. discussions on: 'The Polar Express' (Robert Zemecki, USA, 2004), http://wardomatic.blogspot.com/2004/12/polar-express-virtual-train-wreck_18.html.

²E.g. 'Shrek' (Andrew Adamson, Vicky Jensen, USA 2001).

³<http://www.ed.ams.eng.osaka-u.ac.jp/index.en.html>.
<http://www.ed.ams.eng.osaka-u.ac.jp/research/0007/> (last access 26.9.2008).

considered the *healthy person status* in Mori's overview. The doppelgänger status adds to their uncanniness and provokes ethical questions on the cloning of humans. Other roboticists, aware of it or not, follow Mori's dictum. The MIT humanoid robotics group does not build artefacts that mirror human appearance⁴, and Honda's humanoids are covered by space suits⁵. Interestingly, an attribution to one gender is very obvious in case of the Actroids, whereas the MIT group seeks to avoid a gendering of the artefact [6].

When it comes to the design of embodied interface agents no such diversity can be found. These *Virtual Humans*⁶ [7] aspire toward the *healthy person status* as well. Here, the simulation of lifelike human behavior and appearance is the goal. Just like social robots, Virtual Humans should possess a high degree of autonomy, they should be proactive and they should obtain emotional artificial intelligence. All this is considered to lead to actions that are verbally as well as non-verbally convincing.

Scenarios that employ Virtual Humans favor the concept of a shared space, a mixed reality [8]. Just as in "Through the Looking-Glass" [9], where the mirror serves as an interface that opens up a spatial dimension as well as it is an imaginary place, the conceptualization of Virtual Humans is driven by narratives that interweave human and non-human actors in a collective environment. With Virtual Reality technologies the mirror or screen as technological device, should not be noticeable or better still it should disappear completely. Software agents literally are *Lichtgestalten*⁷. In contrast to robots they cannot move through physical space. It is precisely their on-screen or projected *visual* form of embodiment that seems to free them from the constraints that come with having a material body.

As stated above, Mori names the discrepancy between *looking at* and *touching of* the artefact as one major source of irritation. With the interface agents, touching is impossible - a human cannot shake a Virtual Human's hand. That these artefacts nevertheless are viewed as valid interaction partners can be regarded as a shift of the relation between the visual and the haptic senses. And this may be read against the background of a broader sociocultural reconceptualization, where new technology and media practices turn the material body into a 'visual medium' [10]. Thus nowadays, Mori's example of the prosthetic hand falls a bit short when it comes to explaining the potential uncanny effect of Virtual Humans. And because it is not this gap between *look* and *feel* alone that produces disturbing artefacts, further considerations have to be taken into account.

1.2.2. Semiotics - Interface Design as a Process of Sign Mediation

Virtual Humans are like ghosts. The dematerialized form of embodiment they present, speaks of the wish to overcome the restraints of the physical world; they exemplify *the desire to leave and beat the meat* as it is called in Cyberpunk fiction. The

term avatar⁸, mostly used in science fiction or online role-playing, highlights this transcendent nature of virtual doppelgängers. The goal of embodied interface agents' research of course is not to construct metaphysical devices, but to make computer usage easier. The special hybrid nature of Virtual Humans, however, is no coincidence. As intermediary between human user and more abstract levels of computing technology, the interface agent needs to address both worlds. And because organic life and computers do not operate on the same basis, there need to be modes of translation or transformation. These modes fall in the logic of "the translation of the world into a problem of coding" [11] that are due to the character of the computer as a "semiotic machine" [12].

Computers do not process material objects as other machines might do, they process semiotic representations - descriptions of objects, bodies, environments etc.; the sign subsequently is stripped off the context and becomes computable⁹. The "algorithmic sign" [15] is a special one - it simultaneously gets interpreted by the computer and by the user. The computer and the human participate in an on-going process of sign/signal exchange and interpretation/processing. In current interface scenarios the computer screen, mouse and keyboard play the important role. The sign or symbol on the screen is to be interpreted by the user - likewise the user manipulates computational objects following the executive character of the algorithmic sign. Interface design in this sense means organizing the process of sign mediation in a way that the interpretative activity of the user corresponds with the functioning principle of the computer. This double nature is the challenge software designers have to face. The computer's 'language' in this picture appears to be precise, rule-oriented and non-ambiguous - and that of the human as quite the opposite. For the human a sign is relational and complex - for the computer the signal is a state.

Following the development of interface solutions throughout the years the crucial question seems to have been to either "move the system closer to the user" or to "move the user closer to the system" [16]. Simply put: From a semiotic point of view the question is whether the signs of/on the interface are organised in a way that the user experiences them as being further away from or closer to the computational basis. The computational basis in this discourse is set as abstract and difficult to understand - it presents a sphere for experts, not the everyday user - precisely because signal-processing appears to be context-free and somehow disembodied: "[...] an electronic signal does not have a singular identity - a particular state qualitatively different from all other possible states. [...] In contrast to a material object, the electronic signal is essentially mutable" [17].

Against this background, the epistemological move artificial intelligence research has got a history of, becomes understandable. Often, "organisms and machines alike were repositioned on the same ontological level, where attention was

⁴<http://www.ai.mit.edu/projects/humanoid-robotics-group> (last access 13.1.2009)

⁵<http://www.honda-robots.com/english/html/p3/frameset2.html> (last access 13.1.2009)

⁶I use Virtual Human as collective term for embodied conversational agents, personal service assistants, digital substitutes etc.

⁷Beings of light

⁸ Avatar is taken from Hinduism; in its religious contexts 'avatar' is used for describing the human or animal form of embodiment of a god after descending from heaven to earth. She or he may emerge on different places at the same time. Therefore the avatar describes a form of representation that is not bound to the rules of physical reality. Instead the avatar belongs to a meta-reality, where death and pain have no meaning.

⁹I simplify this point here, and do not cover the full abstraction processes that need to take place with steps like formalization, standardization, executability. Cp. [14]

riveted on semiosis, or the process by which something functioned as a sign" [13].

The oscillating status of the Virtual Human - a body made out of signs that claims to count as a *real human embodiment* - points at the underlying principles of computer science. This reminds one of ghosts, in the way that the material body is left behind and there now is only information that matters and produces a new way of being.

Virtual Humans present a very interesting solution for the mediation process that takes place at the interface. They are constructed to close the gap between humans and machines. Or, put differently, they should heal the split the hyphen in human-computer interaction symbolizes. It is essential to note, that reduction is only one way of characterizing processes of abstraction. Simultaneously, a kind of doubling effect takes place inherent to the procedure of semiotizing. It seems that the very principles of computer science encourage procreation [14]. Especially with AI technologies the constructive character of language becomes viable. The algorithmic sign obtains a circulating and relational character, it gets derived from the world but it has got formative effects as well. Against this background, the Virtual Human almost literally re-sensualizes abstract technology by providing it with a "Zeichenhaut"¹⁰ [14].

2 RECONSIDERING THE TURING TEST

2.1. The Gender Imitation Game

It is interesting to review how the interaction scenario is characterized in the research field of embodied interface agents. It all comes down to the agent passing as a believable interaction partner. For a successful interaction a stable relationship between user and artefact has to be established [18]. Humans need to trust their virtual counterpart and feel comfortable with it. So, even if the uncanny valley effect as such is at most times not discussed explicitly, *trustworthiness* is a major issue [19]. Following this, the artefact should not arouse uncanny or unsettling feelings whatsoever. In the research field, trust and believability are tried to achieve by constructing the Virtual Human as *lifelike* as possible. This means that with aspiring to mirror the human, a web of sociocultural categories are on the agenda as well. A believable doppelgänger is linked to a believable performance of gender (and interdependent categories like ethnicity, cultural background, age etc.). In fact, for the construction of anthropomorphic interface agents it has been stated, that transgressing the human-machine boundary seems less threatening than transgressing the cultural order of gender [20, 21]. Or, put differently, it seems more acceptable to mix artificial and real life, than to question heteronormative¹¹ gender relations. Is this true - and if so, what does it have to do with the uncanny valley effect?

Interestingly so, it is one of the most classic papers of artificial intelligence research that interweaves the human-machine boundary with the gender order. The Turing test,

proposed in 1950, challenges the ability of a computer to engage in human-like conversation. While various critics analyze the notion of *machine* and *intelligence* Turing develops [22, 23], others [20, 24] have stated that the *gender relevance* of this "founding narrative of artificial intelligence and cybernetics"¹² at most times gets neglected when the test is mentioned today.

In the first version of the paper "Computing machinery and intelligence", Alan Turing starts with inventing the "Imitation Game", which "is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. He knows them by labels X and Y, and at the end of the game he says either 'X is A and Y is B' or 'X is B and Y is A'" [25].

Thus, before Turing develops a scenario for human-machine interaction, he invents a gender imitation game, in which different roles are attributed to each gender. The role of the woman is to be of assistance to the interrogator, and Turing suggests she should do that by being truthful. At the same time it becomes clear that this, too, may cause confusion, because the man might equally claim to be the woman. So, in the course of the game in fact *both* players try to convince the interrogator to be the woman. Turing then suggests to replace the original question, "Can machines think?", by the question, "What will happen when a machine takes the part of A in this game?" [25]. According to this, *the imitation of the woman by the man* may be replaced by *the imitation of the woman by the machine*. By doing so, the test produces a gender biased scenario, but it also introduces the notion of "doing gender" [26], of gender as a performance rather than a fixed, given state. First, Turing suggests that a man may transgress his original gender attribution, before in a second step, he links this to the overcoming of the human-machine boundary. In order to understand the impact of the test, it is important to consider how Turing arrives at this intersection of gender/machine performance. Here the character of the computer as a semiotic machine, and the relation between materiality and the (algorithmic) sign, plays a crucial role. With the gender imitation game Turing suggests a split between the human body and the sign. He describes an experiment in which references to the human body should be eliminated as far as possible. The answers in the game must be delivered via typewriter, because handwriting is too close to the human body and might be a giveaway. The assumed gendered coding of the human voice would equally pose a threat to the success of the game.

In the test setting, it is the *corporeality* of the embodiment that threatens to reveal which player is human and which is the machine, as much as it reveals in the original imitation game, which player is the woman and which is the man. In other words, according to the Turing Test the sign as in the typewritten language, is treated as freed from the connotations, restraints and limits an embodied existence brings along. In the course of the test *embodiment* can mean either the physical materiality of the machine or the human body.

It is this decoupling of the sign and the human body which makes it possible to attribute a rather radical, subversive potential to the 1950s Turing test. As I have stated above, the test is gender biased, and it is no coincidence that the female embodiment and the machine performance superimpose.

¹⁰To become computable all matters must grow a skin (German: Haut) of signs (German: Zeichen).

¹¹The term *heteronormativity* problematizes heterosexuality as a dominant normative setting, which excludes other sexual orientations, lifestyles and identity concepts.

¹²[20] p. 85. Translation by C.D.

Nevertheless, the test does introduce a certain form of *gender queering* acted out by the man. Following this, the test suggests that the heteronormative gender order always already is a symbolic order. Or, put differently: "This construction necessarily makes the subject into a cyborg, for the enacted and represented bodies are brought into conjunction through the technology that connects them. If you distinguish correctly which is the man and which the woman, you in effect reunite the enacted and the represented bodies into a single gender identity. The very existence of the test, however, implies that you may also make the wrong choice [...] What the Turing test "proves" is that the overlay between the enacted and the represented bodies is no longer a natural inevitability but a contingent production, mediated by a technology that has become so entwined with the production of identity that it can no longer meaningfully be separated from the human subject"¹³. In early cyberfeminist discourse [27], for example, exactly this potential of new technology, namely the potential to subvert common gender codes by disarranging naturalized assumptions on bodies and identities, has been welcomed. The deconstructive possibilities that the virtual mirror provides, on the other hand, may be experienced as disturbing and thus allow a deeper insight on what is happening at the borders of the uncanny valley.

2.2. "A Face-to-Face Turing Test"

To sum up, the possibly uncanny artefacts of AI research point at a provocative connection between the gender order and computer science's basic principles. At first glance the situation seems paradoxical: The logic of computing translates the human body into a construct, and this move could serve as an entry point for deconstruction and for the opening up of stereotyped identity concepts. Simultaneously, with end products like the Virtual Human, the idea of a lifelike human copy gets favored. Just as in Mori's overview anthropomorphic artificial beings seek to gain the status of a *healthy person*. And in effect, this goal rather leads to an idealized image of the human than to the construction of diverse, flexible forms of virtual embodiment. With the Virtual Human a mostly unquestioned state of *naturalness* is pursued. And precisely this naturalizing effect of the artefact is used to mask the working modes of the underlying technological device [28]. It is important to keep in mind that Turing's test setting gets established in reference to the cultural gender order, but that he still introduces *gender as a performance* and disrupts the nature-culture dichotomy. He does this by freeing the scenario from material constraints. Turing made it clear, that "no engineer or chemist claims to be able to produce a material which is indistinguishable from the human skin. It is possible that at some time this might be done, but even supposing this invention available we should feel there was little point in trying to make a thinking machine more human by dressing it up in such artificial flesh" [25].

With social robots and Virtual Humans it is exactly the goal to bring *embodiment* back into the picture. For this, the original setting of the Turing test changes into a *face-to-face* situation, and thus, an important epistemological shift takes place. Effectively, now not only the output, but the body itself should be able to trick the audience. The "artificial flesh" in which the

Virtual Humans are "dressed up", is in appearance and behavior, always *gendered* artificial flesh. And precisely at this point the *uncanny* re-enters the stage, as the following remark by Justine Cassell shows: "One way to think about the problem [of human-computer interaction, C.D.] that we face is to imagine that we succeed beyond our wildest dreams in building a computer that can carry on a face-to-face Turing test. That is, imagine a panel of judges challenged to determine which socialite was a real live young woman and which was an automaton (as in Hoffmann's 'The Sandman'). Or, rather, perhaps to judge which screen was a part of a video conferencing setup, displaying an autonomous embodied conversational agent running on a computer. In order to win at the Turing test, what underlying models of human conversation would we need to implement, and what surface behaviors would our embodied conversational agent need to display?" [29].

In this new version of the Turing test the uncanny emerges in reference to E.T.A. famous story "Der Sandmann" [30]. Examples from films and literature are often used for illustrative purposes in artificial intelligence research. In contrast to more common virtual forms of embodiment like computer game characters or avatars, the Virtual Human is conceptualized as autonomous interaction partner and the artefacts are currently not integrated into everyday environments. Using "Der Sandmann" as a vision, not only draws the attention to the gendered implications of the human-machine boundary, it also points at the possible uncanniness of the artificial being. At most times, dystopian threads of science fiction are neglected when used as an example. "Der Sandmann", especially, produces a picture that is not a very uplifting. Why then is it, that Cassell cites this romantic story in which Nathanael, the *user* of the machine Olimpia, dies in the end, and the artefact gets dismantled? What might be learned from this for a broader conception of human-humanoid interaction?

3 VIRTUALLY GENDER TROUBLE

3.1. The Case of Olimpia

Basically, "Der Sandmann" tells a story of user and artefact. In the narration the male protagonist Nathanael gets frustrated with his fiancée Clara, mainly because she rejects the flow of his ongoing poetic recitations. He encounters the artificial being Olimpia, and falls in love with her. In the course of the novel, the role of the *real live young woman* Clara, and that of the *automaton* Olimpia transposes, exactly as it is envisioned in the Turing test. Subsequently, Nathanael experiences Olimpia as warm and caring, whereas the character of Clara, for him, reverses. But this only happens for Nathanael. Olimpia, who in the perspective of all others in the story, remains *cold and machine-like*, serves as a projection space for him. She truly represents a *desiring machine*¹⁴. When it comes to the encounter between Nathanael and Olimpia, it is his agency that animates the object. The fact that *his lips spread warmth to hers*, that *the spark of his eyes activate hers*, is noteworthy for the field of human-computer interaction. For a short moment Nathanael also experiences the uncanny effect that Mori describes for the

¹³[21] p. xiii

¹⁴Cp. the cyberpunk novel 'Idoru', in which the virtual being Rei Toei is an "aggregate of subjective desire" [31].

prosthetic hand, but then he manages to overcome the uncanny valley: "Olympia's hand was as cold as ice; he felt a horrible deathly chill thrilling through him. He looked into her eyes, which beamed back full of love and desire, and at the same time it seemed as though her pulse began to beat and her life's blood to flow into her cold hand"¹⁵.

According to this, the human-machine interaction in this story gets established and stabilized via acting out a heterosexual relationship. Olympia's passing of the Turing test depends on the fact, whether her gender performance is convincing enough to superimpose the machine character. As stated above, Olympia passes only in relation to Nathanael, all others experience her as *uncanny*. Siegmund, Nathanael's friend, is extremely worried and voices his concern about Olympia: "Nevertheless, it is strange that many of us think much the same about Olympia. To us - pray do not take it ill, brother she appears singularly stiff and soulless. Her shape is well proportioned - so is her face - that is true! She might pass for beautiful if her glance were not so utterly without a ray of life - without the power of vision. Her pace is strangely regular, every movement seems to depend on some wound-up clockwork. Her playing and her singing keep the same unpleasantly correct and spiritless time as a musical box, and the same may be said of her dancing. We find your Olympia quite uncanny, and prefer to have nothing to do with her. She seems to act like a living being, and yet has some strange peculiarity of her own"¹⁶.

Hence, Olympia's computability and rule-orientation do not simply make her boring and predictable, she falls into the uncanny valley. Olympia is accused of just pretending to be a lifelike being which also means: she just pretends to be a woman. In Sherry Turkle's work on the computer as a "Second Self" it is the machine origin in particular that renders the artefact as uncanny. She states that: "A being that is not born of a mother, that does not feel the vulnerability of childhood, a being that does not know sexuality or anticipate death, this being is alien" [32]. And indeed, science fiction narratives are full of lost beings that search for some kind of belonging, which at most times results in a quest for a proof of their own genealogical identity¹⁷. Now, this point is not made in order to support oppositions of *natural origins* in contrast to artificial ones. Rather it is referred to in order to illustrate how and where the boundary between human and artefact usually gets drawn. On the one side there are organic heterosexual reproduction, vulnerability, fear of death, the finiteness of life, which define humanity. Beings like Olympia, on the other side, hold the power to transgress this "life cycle"¹⁸. They present an escapist fantasy, but they pay for this by risking to appear non-human, uncanny and alien.

3.2. The Uncanny Revisited

While searching for explanations that might unravel the textures of the uncanny valley effect, the cultural order of gender and the human-artefact relation, several threads can be taken up.

For example, in an article on *Digital Beauties* Karin Esders states that it is the virtual embodiment's lack of being traced back to a material body which makes it uncanny [33]. The normative and stereotyped appearance of Virtual Humans, too, derives from the missing "material reference and bodily distinctiveness"¹⁹ which would hold a potential to induce moments of resistance and thus may produce alternate forms of embodiment. This is a question of the origin of the artefact again, as well as Esder's findings pose questions on the role of the material and the semiotic.

According to Mori, humanoids fall into the uncanny valley if they reach a high degree of human likeness but still produce minor lapses. They are somehow not quite there yet. Hence, "virtual beings embody a state of 'as well as' and of 'neither - nor'"²⁰ and this not only points at the potential to recode and transgress what is considered human, but also at disturbances in the realm of gender.

In the classic essay in which he analyzes the uncanny effects of "Der Sandmann", Sigmund Freud defines "the uncanny" as "that class of the frightening which leads back to what is known of old and long familiar"²¹. The uncanny in this view is something which has been repressed and then re-enters the stage. In Mori's overview, the undead is even more frightening than the dead corpse. One cannot help to wonder, why that is. Against the Freudian background, the question occurs, what it is actually that comes back to haunt the human in form of Olympia - or the Virtual Human. In a rereading of Freud's article, Hélène Cixous points out that Freud marginalizes the meaning of Olympia and focuses on Nathanael. According to her, however, the key to understand the uncanny lies in Olympia's role as a hybrid and intermediary: "It is the between that is tainted with strangeness. Everything remains to be said on the subject of the Ghost and the ambiguity of the Return, for what renders it intolerable is not so much that it is an announcement of death nor even the proof that death exists, since this Ghost announces and proves nothing more than his return. What is intolerable is that the Ghost erases the limit which exists between two states, neither alive nor dead; passing through, the dead man returns in the manner of the Repressed. [...] In the end, death is never anything more than the disturbance of the limits. [...] Olympia is not inanimate. The strange power of death moves in the realm of life as the Unheimliche in the Heimliche, as the void fills up the lack" [34]. It is the positioning of technological artefacts between two states, their being "neither flesh nor fowl" [35], that adds to their ghost-like quality that characterizes their uncanniness. In Mori's valley the (un)dead are gathering. In a broadened conception this "immense system of death" represents the abject, the outcast, the monstrous - in short, it is that which threatens human identity on its way to get a valid identity status itself.

Following Judith Butler, obtaining an intelligible form of subjectivity goes hand in hand with the heteronormative ordering system [36]. For the production of the uncanniness of Virtual Humans, especially the interconnection of gender and melancholia is of interest [37]. According to Butler, it is crucial to note that when it comes to the formation of the gendered self, the *taboo against homosexuality* is the founding prohibition²². The construction of a heteronormative gender identity is always

¹⁵ [30], p. 37. Here: English translation by John Oxenford.

http://www.fln.vcu.edu/hoffmann/sand_e.html (last access 13.1.2009)

¹⁶ [30], p. 40.

¹⁷ For example, "A.I. - Artificial Intelligence" (Steven Spielberg, USA 2001)

¹⁸ [32], p. 311.

¹⁹ [33], p. 101. Translation by C.D.

²⁰ [33] p. 111, Translation by C.D.

²¹ [5], p. 46. Translation: <http://www.rae.com.pt/Freud1.pdf> (last access 13.1.2009)

based on the primary loss of the homosexual object of desire. This repressed *lost other*, which cannot live and also cannot be mourned, gets incorporated as part of the self. To produce a theory of the doppelgänger²³, Steve Garlick [38] suggests to link Freud's concept of the uncanny with Butler's theory of identity formation. When Butler's powerful concept of identity formation is taken seriously, the gendered body itself can be considered as a *haunted house* because it incorporates *the lost other*. Thoughts like these are challenging, but they may indeed provide a deeper insight into the shady status of artificial beings.

The potential uncanniness of the Virtual Human makes sense, when identity formation is understood as a process, and not simply seen as a fixed state or a *natural* inevitability. Rather, the forming of a self must be viewed as an on-going performative act in which the subject recites intelligible norms. The notion of gender as an activity, the way of *doing gender*, also leaves some space for breaches and lapses of gender regulations. What the Turing test does is, it exemplifies the deconstructive potential of computer science by introducing *gender* and *machineness* as valid players in the game. No matter what is ascribed to you, in the test you may *perform drag*. Against this background, the Virtual Human does not just fill the void between human and the computer - it also is the representation of the space between man and woman. And this may be experienced as uncanny and even threatening, given how intelligible identity concepts are gained.

Earlier I have stated, that the Virtual Human interface, as it is the case with Hoffmann's Olympia, is likely to produce a paradoxical situation. The very existence of cyborg beings on the one hand, threatens the nature-culture dichotomy. On the other hand, this blurring of strict boundaries seems to nourish the need to stabilize the symbolic gender order rather than to dissolve it. It is the strict following of this ordering system that holds the promise for the artefact to reach the status of a human subject. The Virtual Human already is defined as a hybrid, and thus it cannot take additional risks by transgressing a norm so central to our culture. This seems to be even more true, since the artefact already has to hide its machinelike character following the goal of the research field. As with Olympia, this agenda, is likely to produce lapses and errors. Not necessarily because the artefact is designed badly that is, but because the underlying working modes of computerization always will shine through. The case of Olympia, amongst other things, also tells a story of how the idea of being human gets recovered in the face-to-face Turing test. And computability, standardized behavior, predictability, formalization still are considered as characteristics of the machine - not the human.

According to Freud the uncanny (German: *unheimlich*) oscillates between the home (dem Heim) and the strange (*unheimisch*). For Esders the relation between private and public places always has had gendered connotations. Still in the 1950s, for example, the family home was considered to be the sphere for women, and those who stepped out of this ordering system were regarded as threatening. In the research area of Virtual Humans, the simulation of human appearance and behavior

stands for ease of use and trust. Their embodiment can be seen as a housing that transforms abstract computing modes into something comfortable and makes the user feel at home. It is no wonder then that so many artificial beings, in fiction and in science are conceptualized as female. But this artificial housing also transports dimensions that are unintended by the designers.

Earlier I posed the question, why with "Der Sandmann" a story is cited which is rather disturbing from a technological point of view with the user dying and the artefact getting destroyed. One answer may be, that the reference to this narration speaks of the desire to overcome *the between that is tainted with strangeness* and put a different ending to the story. Maybe the artefact finally could pass the Turing test. Chances are, however, that this always will prove to be an escapist fantasy.

For a really different ending of the story the analysis of the pictured user-artefact scenario with all its complicated implications must be taken seriously. When Turing in the 1950s was able to introduce an interaction scenario that oscillates between the dissolution and the fixation of identity norms, there now may be the time to reclaim that inbetween space and go for more diverse forms of virtual embodiment. What can be learned from the story of "Der Sandmann" is the fact, that human-humanoid interaction always comprises a network of meanings and relations. The humanoid itself may only be pre-scripted up to a certain point. A different scripting of the whole setting of the technological narration, however, will eventually result in the production of more *realistic*, less idealized artefacts.

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²²Freud characterizes the formation of the ego as melancholic structure. The child has to give up the desire for its parents because of the incest taboo. Butler however argues, that the taboo against homosexuality precedes the incest taboo. [36] p. 64.

²³In reference to Jacques Derrida he introduces the doppelgänger as the *revenant*, as something which comes back. For Freud also the doppelgänger is threatening because of this.

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