



The Japanese Roboticist Masahiro Mori's Buddhist Inspired Concept of “*The Uncanny Valley*” (*Bukimi no Tani Genshō*, 不気味の谷現象)

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ABSTRACT

In 1970, the Japanese roboticist and practicing Buddhist Masahiro Mori wrote a short essay entitled “On the Uncanny Valley” for the journal *Energy (Enerugi)*, 7/4, 33–35). Since the publication of this two-page essay, Mori’s concept of the Uncanny Valley has become part and parcel of the discourse within the fields of humanoid robotics engineering, the film industry, culture studies, and philosophy, most notably the philosophy of transhumanism. In this paper, the concept of the Uncanny Valley is discussed in terms of the contemporary Japanese cultural milieu relating to humanoid robot technology, and the on-going roboticization of human culture. For Masahiro Mori, who is also the author of *The Buddha in the Robot* (1981), the same compassion that we ought to offer to all living beings, and Being itself, we ought to offer to humanoid robots, which are also dimensions of the Buddha-nature of Compassion.

“What is this, Channa?” asked Siddhartha. “Why does that man lie there so still, allowing these people to burn him up? It’s as if he does not know anything.”

“He is dead,” replied Channa.

“Dead! Channa, does everyone die?”

“Yes, my dear prince, all living things must die some day. No one can stop death from coming,” replied Channa.

The prince was so shocked he did not say anything more.

(*The Fear and Terror Sutra (Bhaya-bherava Sutta)* translated from the Pali by Thanissaro Bhikkhu)

Masahiro Mori and The Cultural Dimension of Japanese Robotics

In a *New York Times* article published in 1982, entitled “Japan’s Love Affair with the Robot,” Henry Scott Stokes discusses some stark contrasts between the degree to which the robotic industry was developed in Japan in the early 1980s, as opposed to most other countries. Stokes focuses on the degree to which the Japanese attitude toward the robot radically differed from the common Western attitude. For example, while “the modern robot industry had its start in the United States,” Stokes states, “there are 140 robot manufacturers in Japan as compared with 20 in the United States” (Stokes 1982, 24). And as for different attitudes towards robots, Stokes describes how new industrial robots in Japan were more often than not first blessed by Shinto priests, after which the employees burst into applause, welcoming “the new member” of their team.¹ Typically, Stokes says, workers greet the robots at the start of the working day with “*Ohayo gozaimasu*,” Good Morning!

A recent documentary, *Japan: Robot Nation* (2008) depicts the almost seamless relationship between the Japanese and their robot culture. Jennifer Robertson, a specialist in Japanese robotics, discusses the massive demographic shift in an aging population in Japan; as a result, she says, Japan is embracing the idea of a form of multiculturalism that factors in the “social robot” as an intrinsic aspect of day-to-day life, including robots that can help bring up the kids, teach, take care of the elderly, and even grocery shop (Robertson 2010). According to professor Ono Goro of Saitama University in his popular book *Accepting Foreign Workers Spoils Japan* (2008), the Japanese would, in general, prefer a humanoid robot in their social milieu rather than a human foreigner (Japan: Robot Nation 2008). Professor Goro and many other nationalists of his ilk argue that robots are better for Japan than immigrants when it comes to solving the evolving demographic decline in the population. Japan presently has the highest number of industrial robots per capita in the world and has formally articulated the roboticization of its culture as a way of maintaining its economic prestige: the government-sanctioned *Innovation 25 Vision Statement* of 2007 contains an official plan to implement personal humanoid robots in every home and school environment by the year 2025 (Government of Japan 2007).

There are differing explanations to account for the *uniqueness* of the modern Japanese acceptance of robots and robot culture. Some point to the Japanese tradition of the imaginative culture of human/nonhuman crossovers in *anime*, *manga* and *Karakuri Ningyo*² puppet culture, others to what they view as the ritualistic, formalistic, i.e., “robotic-like” aspect of traditional Japanese culture. Still others refer to the legacy of the so-called “*Eastern/Asian/Oriental*” embrace of the “*Oneness of all things*,” even when it comes to the dichotomy between virtuality/reality. This particular embrace of Oneness is then opposed to the so-called “Western,” Judeo-Christian *Genesis* version of humans as separate from, but ruling over, the rest of creation. Osamu Tezuka (1928–1989), who is considered the central figure in the development of both *anime* and *manga* in Japan after World War II, expresses this sentiment:

Unlike Christian Occidentals, the Japanese don’t make a distinction between man, the superior creature, and the world about him. Everything is fused together, and we accept robots easily along with the wide world about us, the insects, the rocks – it’s all one. We have none of the doubting

attitude toward robots, as pseudohumans, that you find in the West. So here you find no resistance, just simple quiet acceptance. (Stokes 1982, 6)

While this explanation is convincing on a surface level, it does not mesh with Japan's pre-1945 use of technology as an extension of the domination of the sword, as in the *bushido* ethic of the samurai, as Japan's techno-military prowess demonstrated pre-1945.³ Although the militarists of the period viewed technological mechanization in a utopian manner, a wide-spread skepticism of such mechanization pervaded Japanese society. For example, much pre-War Japanese literature, was concerned with what Miri Nakamura he has termed the *Mechanical Uncanny*: "the literary mode that blurs the line between what is perceived as natural and what is perceived as artificial" (Nakamura 2002, 365). This *Mechanical Uncanny*, states Nakamura, led Japanese intellectuals to bring out the "terror" that can be brought about through technological mechanization. According to Nakamura, much prewar Japanese literature attempted to "destabilize" the place of technology in society, in an attempt to subvert "the ideologies of the machine age":

Machines and technology in prewar Japan, however, did not simply represent social progress; they also came to be associated with fear and degeneration. In the words of one scholar, prewar literature depicting machines was in "a constant flux between a utopian dream of machines on the one hand and a pessimistic nightmare of them on the other." (Nakamura 2002, 366):⁴

The end of WW II marks a major shift in Japan's technological development: what can be described as a shift from the belligerent to the benign. Japan's present political constitution was imposed by the Allies following World War II and was intended to replace Japan's prewar militaristic and absolute monarchy system. Chapter Two, Article 9 of Japan's present constitution (which came into effect in 1947), entitled "The Renunciation of War," enforces pacifist social values, and hence, by implication, pacifist technology:

Aspiring sincerely to an international peace based on justice and order, the Japanese people forever renounce war as a sovereign right of the nation and the threat or use of force as means of settling international disputes.

To accomplish the aim of the preceding paragraph, land, sea, and air forces, as well as other war potential, will never be maintained. The right of belligerency of the state will not be recognized. (Constitution of Japan 1947)

If the Axis powers had been victorious at the conclusion of WWII, it might have been the Americans and Soviets who would have been forced to develop more peaceful uses for robotic technology. As it happened, in both the Soviet Union and the United States, post-1945, economically belligerent, i.e., military reasons, provided a driving force in the interest in robotics and technology. By contrast, Japan, given Article 9 of its constitution, has mainly been motivated by economically peaceful reasons – an impulse to make life less menial while at the same time more profitable and pleasurable. It is in this context that the Buddhist roboticist Masahiro Mori (born 1927) is such a significant figure in the Japanese robotics and AI community. Mori's pacifist approach to technology and robotics best represents the postwar Japanese thinking about the role of robotic technology in modern society.⁵

Masahiro Mori: The Uncanny Valley

Although Masahiro Mori is most well known outside of Japan for his development of the concept of the Uncanny Valley, he is more importantly recognized in Japan as the founder of the *Jizai Kenkyujo* (*Mukta Institute*, 1970), an influential Buddhist-based, Japanese think-tank providing corporations and research centres with assistance regarding roboticization and automation. In this capacity, he has had a direct

influence on the development of some of the more advanced humanoid robots to have been developed in Japan, such as, for example, Honda's humanoid robot Asimo.⁶ He is the author of *The Buddha in the Robot: A Robot Engineer's Thoughts on Science and Religion* (1974). He is also the founder of Robocon, a world-wide amateur robot contest intended to share and celebrate robot engineering technology. Formerly an engineering and robotics professor at the Tokyo Institute of Technology, Masahiro Mori is at present (2013) the Emeritus President of the Robotics Society of Japan.

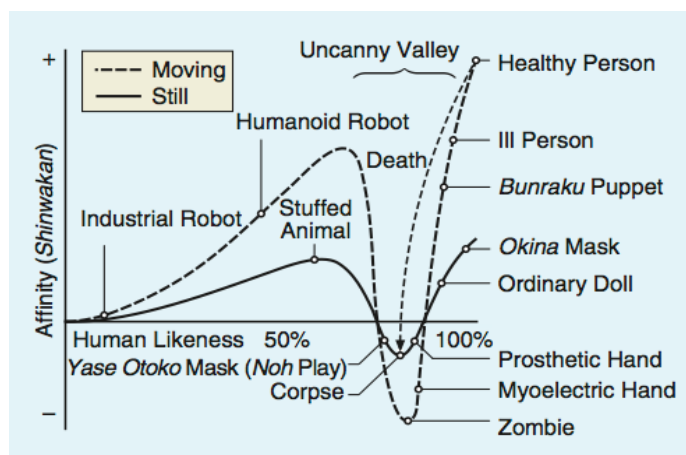
In his 1970, two-page, koan-like article entitled "The Uncanny Valley," Mori argues that the more social robots (as opposed to industrial robots) are designed to appear 100 per cent humanlike, the more they will appear less human, strange, unlikeable and in some cases horrific, resulting from some technological glitch in either their appearance or movement, thus causing a *fearful* sense of the "uncanny," in the way a corpse, or worse yet, a zombie causes a sense of uncanny strangeness or emotional recoiling. In a peaceful society – a more Article 9 society, and for Mori a more Buddhist-based society – robots and robotically enhanced humans ought to be experienced as non-threatening. In 1970, on the basis of his concept of the Uncanny Valley, Masahiro Mori advised his fellow roboticists to design humanoid robots that act and perform as humans, but do not look and move exactly like the human, in order that the humanoid robots will be more socially accepted.

Mori based his idea of the Uncanny Valley on a personal experience: as a roboticist who developed the engineering for robotic/prosthetic fingers, he felt that even the most humanlike prosthetic hand available commercially in 1970, which had been developed in Vienna, still left one with a sense of the uncanny and unfamiliar. Despite how technologically developed this prosthetic hand was, and how humanlike it appeared, shaking such a cold, lifeless hand, says Mori, left one shocked, and horrified to a degree. Hence, in the case of a siliconed humanlike prosthetic hand, Mori suggests that a wooden hand, modeled on a version of the hand of the Buddha of Compassion (Mori 2012, 100),⁷ but with the same technological precision of the Viennese hand, might more likely be accepted by the human, with a sense of familiarity rather than aversion. The core of Being, from a Buddhist perspective, is compassion. Why create new forms of being that are intrinsically forms of aversion rather than compassion? This is the Buddhist subtext of Mori's concept of the Uncanny Valley.

Mori begins his paper with a graph based on the mathematical function $y = f(x)$, an abstract formula that explains simple cause and effect: the value of y depends on (or is an effect of) the value of x . For example, stepping on the gas pedal (x) results in causing the car (y) to move. Normally, this cause-effect relationship holds in our world. But not all things, Mori observes, fall under the formula $y = f(x)$. Simple cause and effect is not the way the world works. Although in our everyday, practical world, $y=f(x)$ is the way things *often* work, it is not always so:

This kind of relation is ubiquitous and easily understood. In fact, because such monotonically increasing functions cover most phenomena of everyday life, people may fall under the illusion that they represent all relations. Also attesting to this false impression is the fact that many people struggle through life by persistently pushing without understanding the effectiveness of pulling back. That is why people usually are puzzled when faced with some phenomenon that this function cannot represent. (Mori 2012, 98)

Mori's own example is taken from the movement of walking: in climbing a mountain, there are hills and valleys, with no necessary $y = f(x)$ cause and effect relationship for getting from point A to B. In the attempt to create 100 per cent humanlike resemblance in robotic technology, we humans fail. Stuffed animals and puppets are more accepted by us as fellow travellers than such things as prosthetic hands that are created to *appear* 100 per cent humanlike. Such human creations end up in the Uncanny Valley, alongside the experience of human corpses and zombies:



(Mori 2012, 99)

Mori developed his concept of the Uncanny Valley after attending Japan's space-age themed Expo '70 held in Osaka in 1970. Expo '70 was held at the height of the Cold War, which was, in a political chessboard of real-time contestation, played out in the jungle-environment of the Vietnam War, a brutal display of human ideological violence that claimed the lives of approximately two million Vietnamese, Cambodians and Laotians, and 60,000 Americans. In the context of this Cold War mentality, Expo '70 had as its "alternative" theme the "Progress and Harmony for Mankind," à la Article 9 of the Japanese constitution.

This Expo carried on the tradition of the first international Expo, the *Great Exhibition of the Works of Industry of all Nations*, held in London in 1851. The ultra-modern architecture of the buildings of Japan's Expo '70 rivalled in both ingenuity and uniqueness London's *Crystal Palace*. On display in this Expo were a large moon rock brought back by the Apollo 12 astronauts in 1969; the first IMAX film; the first spherical concert hall; recently developed mobile phones based on local area networking; the most advanced magnetic levitation train technology; and a wide variety of prosthetic devices and humanoid robots. In the after-effects of this exuberantly utopian celebration of the infinite moral and technological perfectibility of the human being, Masahiro Mori tossed in a monkey wrench with his two-page publication of "The Uncanny Valley." In one off-handed comment Mori states that "creating an artificial human is itself one of the objectives of robotics" (Mori 2012, 98) (such a statement that would horrify the likes of a Heidegger, Fukuyama or Margaret Atwood). However, his concept of the Uncanny Valley was a symbolic counter-thought to some of the more utopian ideals of Expo '70. It questioned, however obliquely, the concept of the utopian desire to remanufacture the *present* human, *ad infinitum*, but with better technology.

While the concept of the Uncanny Valley has since played a significant role in the Japanese robotics industry devoted to the development of social robots, it has recently garnered more interest in the film industry, especially the American film industry. CGI technology has allowed for more of a cross-over between animation and realism. However, if an animated character appears too *almost-real*, such as Tom Hanks in the movie *Polar Express* (2004), the audience recoils. Animation is not yet at the point that it can replicate realistically a virtualized human. Hence, because it fell into what Mori would describe as the Uncanny Valley, *Polar Express* was a box-office flop, while the movie *Avatar* (2009), which did not depend on complete animated human likeness, was a success (although it was a poor movie for other reasons relating to its maudlin plot). It is also clear that the "face" or "avatar" of the IBM supercomputer Watson was developed with a concept of the Uncanny Valley in mind, when it first appeared in the quiz show *Jeopardy!* in February of 2010, in a human-versus-machine contest (Watson came in first place).

As Watson had to appear beside two humans, its “appearance” and “movement” were of critical importance for its designers. David Ferrucci, Watson Principal Investigator of IBM Research, describes the approach that was taken in this project to present a “face” or “avatar” for Watson, which is simply a cluster of ninety IBM Power 750 servers:

Lots of thinking went into this. Should it be humanoid, should it be abstract? In the end, what really made a lot of sense was to be really clear that this is an IBM creation and what better than “the smarter planet” logo for communicating that? (Davis 2011)⁸

The “smarter planet” logo (Mori’s “still”) was coupled with forty-two coloured threads criss-crossing the globe (Mori’s “movement”). Although Watson’s engineers gendered it as male (given its male name and voice), they did not attempt to enter the Uncanny Valley by associating an exact human-like face or avatar to it. Interestingly, this idea appears to dominate more recent developments in prosthetics, as is evidenced by DARPA’s recent mind-controlled, bionic arm-and-hand, which can be used either with a silicon covering, or without one (UltraTechTalk, 2012), and Aimee Mullins’ demonstration of her twelve different types of prosthetic legs, some of which look human-like, and some which do not (Mullins, 2009). In a recent study carried out at Princeton University, even monkeys appear to have the sense of an Uncanny Valley when confronted with images of monkeys’ faces that appear *almost* close-to-real. Instead of cooing and smacking their lips when viewing exact representations of other monkeys, the monkeys almost immediately avert their glances and act frightened when confronted by the *almost* close-to-real images (MacPherson 2009).

On the other hand, while there are roboticists who have heeded Mori’s advice, and created human-like, social robots that appear more *anime*-like, others have attempted to create social robots that are intended to replicate an exact, 100 per cent human likeness, and there are some who argue that, when it comes to Robotics and Artificial Intelligence, the sense of the so-called Uncanny Valley soon fades, as it would fade, for example, with more exposure to a prosthetic hand, such as the Viennese hand. In fact, within minutes, some roboticists claim, even if a very humanlike robot appears uncanny, the sense of the uncanny dissolves quickly (Sofge 2010, 2):

David Hanson, a roboticist whose company, Hanson Robotics, specializes in ultra-realistic robotic heads, actively seeks out the uncanny. He keeps the motors in his rubber-skinned faces noisy and overtly robotic, and sometimes presents these lifelike talking heads mounted on a stick. And for better or worse, even the shock value of Hanson’s buzzing, decapitated heads doesn’t stick around for long. “In my experience, people get used to the robots very quickly,” Hanson says. “As in, within minutes.” (Guizzo 2010, 1)

A 2009 empirical study of Mori’s concept of the Uncanny Valley concludes by claiming that, contra Mori, humanlike androids that were slightly distinguishable from humans were not liked less than humans (Bartneck et al. 2009). For these researchers, the future of “highly realistic androids” bodes well, and therefore, they argue, the Uncanny Valley hypothesis no longer ought to be used to hold back the development of such humanoid robots.

Pre-Mori European academic studies of “the uncanny” began in the early twentieth century, although they have only a slight resemblance to Mori’s concept of the uncanny. Ernst Jentsch’s 1906 essay “On the Psychology of the Uncanny” viewed the human sense of the uncanny in an evolutionary context: fear of the unknown, argues Jentsch, lies at the core of the consciousness of all living beings, and their very existence. On this account, fear of the unknown is hard-wired into consciousness itself – humans experience this particular fear as the Uncanny, or Unfamiliar (*Unheimliche*). While much of what is

considered ‘uncanny’ for the modern human is either a result of primitive baggage, various forms of intoxication, or mental derangement, claims Jentsch, a fearful sense of the uncanny/unknown still lies at the epicenter of modern human consciousness – which is why modern humans so aggressively cultivate the practice of “science” (Jentsch 1996, 16).

Freud’s 1919 essay on “the Uncanny” is written as a response to Jentsch. Although Freud agrees with Jentsch concerning the innate human fear of the unknown/uncanny, he offers a psychoanalytic interpretation of this particular fear, claiming it to be the primitive fear of castration, *Kastration Angst* (Freud 2003, 139). Neither Jentsch’s nor Freud’s view of the Uncanny appears to have influenced Mori’s concept of the Uncanny Valley. On the other hand, in an interesting manner, both Jentsch and Freud discuss the uncanny in terms of the *Automat* robot character Olimpia who appears in E.T.A. Hoffmann’s novel *The Sandman*. Neither Jentsch (1906) nor Freud (1919) considered the kind of real-time robotic uncanniness that Mori was confronted with in 1970.

As for a more specific Western influence on Mori’s conception of the Uncanny Valley, Norbert Wiener’s 1948 *Cybernetics: Or Control and Communication in the Animal and the Machine*, entranced Mori when it was first translated into Japanese in 1961. The “Animal in the Machine” that Wiener predicted shared Mori’s pacifist view of the field of robotics (and Mori’s later conception of the “Buddha in the Robot”). Although Wiener had developed his concept of cybernetics during his war efforts during WWII (in designing the automatic aiming and firing of anti-aircraft guns), he became a staunch pacifist after the war, campaigning against the militarization of science. His pacificism is already evident in *Cybernetics*, which was written shortly after the war:

We have contributed to the initiation of a new science [cybernetics] which, as I have said, embraces technical developments with great possibilities for good and for evil. We can only hand it over into the world that exists about us, and this is the world of Belsen and Hiroshima. We do not even have the choice of suppressing these new developments. They belong to the age, and the most any of us can do by suppression is to put the development of the subject into the hands of the most irresponsible and the most venal of our engineers. The best we can do is to see that a large public understands the trend and the bearing of the present work, and to confine our personal efforts to those fields, such as physiology and psychology, most remote from war and exploitation. (Wiener 1948, 38–39)

When Mori the roboticist first conceived of the Uncanny Valley, he was an avid practicing Buddhist. From a Buddhist point of view, to be *fully* human requires a radical rethinking of what it means to be a human in the first place. The given, a priori, “human” is a being straddled with an unfulfillable desire, *tr̥ṣṇā*: the clutching desire for the permanency of an *ego-based* form of self-identity. The praxis and ethics of *letting-go* of this desire make way for a different sort of human, a *trans-human of sorts*, a “Buddhist.” Hence, from a Buddhist robotics perspective, why try to replicate the present human in the first place, the same “human” that one ought to overcome? In Mori’s essay, “The Uncanny Valley,” the technologically created Viennese robotic prosthetic hand appears as a metaphor for our recoiling from what ought to be considered unfamiliar and strange from a Buddhist perspective: i.e., human nature circumscribed and constituted by *tr̥ṣṇā*. If compassion constitutes the essential nature of Being, and hence the human being, it follows that humanoid robots ought to reflect this – not uncanny or unfamiliar, but of the essence of Buddhahood: compassion. Hence, it comes as no surprise that Mori concludes his essay with a reference to a Buddha of Compassion’s wooden hand, suggesting that this hand may be less uncanny and unfamiliar to human beings than a realistic prosthetic. From a Buddhist perspective, the world of the human is fake enough: there is no need to make it more fake.

The Buddha in the Robot

“*Man will never reach the moon regardless of all future scientific advances.*”

– Dr. Lee De Forest, inventor of the Audion tube and a father of radio, 25 February, 1967.

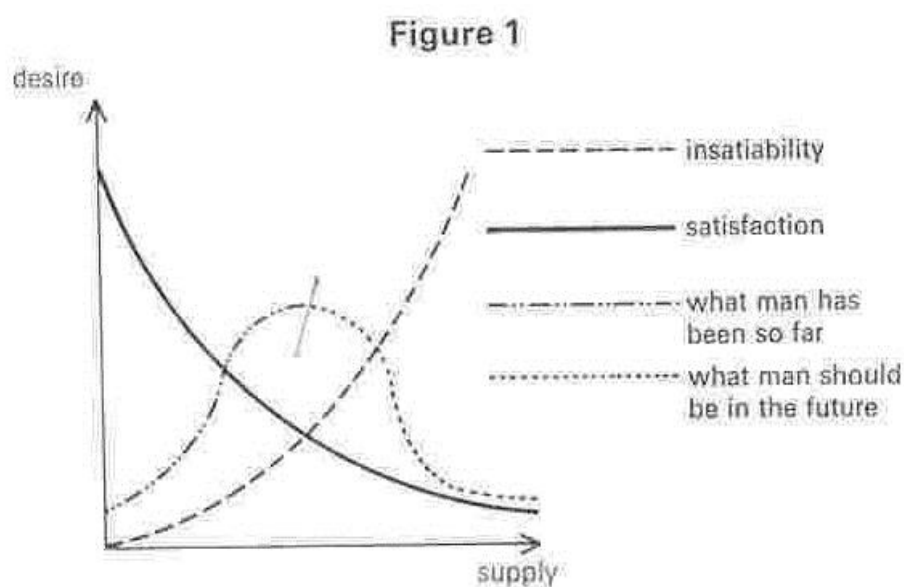
In his book, *The Buddha in the Robot*, written some four years after “The Uncanny Valley,” Mori does not *once* mention the concept of the Uncanny Valley, although the Buddhist subtext of his essay permeates the book. The “healthy person” is no longer considered to be at the apex of the familiar or the likeable: that apex is attained with the enlightened insight of Buddhist *prajñā* (Enlightenment). The world itself is afflicted by ignorance, claims Mori, “which is seen in Buddhist philosophy as the fundamental cause of all evil” (Mori 1981, 8). In the 1981 preface to the English translation of the *Buddha in the Robot*, Mori articulates an overly exuberant and naïve view of Buddhism as “the truest, the most perfect, the most universal, and the most magnanimous of religions” (Mori 1981, 9). Taoism, Confucianism and Shintoism are surprisingly not mentioned in this book, although if one were to comprehensively treat the issue of robots and AI in 1981 in Japan, in terms of “traditional” Japanese culture, one would no doubt have to treat the contributions of these three other Japanese traditions.

Clearly, as both a Pure Land and Zen Buddhist, Mori shows a perspective that is characteristic of modern Japanese Buddhism, which emerged out of its persecution during the Meiji Era ((明治時代 *Meiji-jidai*, 1868–1912). During this period, Buddhism was censured as “a corrupt, decadent, antisocial, parasitic, and superstitious creed, inimical to Japan’s need for scientific and technological development” (Sharf 1995, 110). However, instead of conceding defeat, Japanese Buddhist leaders developed what came to be known as New Buddhism (*shin bukkyō*), which was considered “true” or “pure” Buddhism, and “which was found to be uncompromisingly empirical and rational, and in full accord with the findings of modern science” (Sharf 1995, 110). Although Mori himself does not self-identify his Buddhist persuasion with “New Buddhism,” or with any particular sect of Japanese Buddhism, in the *Buddha in the Robot*, the membership of his Mukta Institute held both Pure Land and Zen Buddhist views (Schodt 1998, 207). Although in no way possessing the philosophical acumen of the notable Japanese Buddhist philosopher Nishida Kitarō (1870–1945), Mori, as a roboticist, not a philosopher, expressed insights with which Kitarō would no doubt have agreed. They would have agreed that Buddhism’s basic principle or insight is that *all* things in the cosmos are manifestations of the primordial Buddha-nature of Enlightenment, Compassion, and Nothingness/Emptiness. Hence, Mori, without hesitation, claims in this book that “robots have the buddha-nature within them – that is, the potential for attaining buddhahood” (Mori 1981, 13). *The Buddha in the Robot* also contains the messianism of Pure Land (Amitāba-Buddha/Sukhāvātī) Buddhism, as, for example, when Mori states that his robot’s call is loud and clear: “The more mechanized our civilization becomes, the more important the Buddha’s teaching will be to us all” (Mori 1981, 57).

In the late 1980s, Frederik L. Schodt had the opportunity to attend a meeting of Mori’s *Mukta Institute*. Schodt describes a typical meeting of this group:

As part of this process, Mukta members regularly meet to recite Buddhist scriptures, meditate, and attempt to consider problems in new ways. On the wall of the room in which the meetings are held, along with Buddhist calligraphy, is an elaborate clock with no hands that tells no time; in the center is a yin-yang shaped table that can be split in half and reconfigured in a myriad of ways to encourage different methods of communication. Here the members imagine new robots, cars, and methods of automation, and, as [member] Matsubara says with a chuckle, “occasionally sip some sake.” (Schodt 1998, 210)

The *Buddha in the Robot* contains a graph, not of the Uncanny Valley, but what could be described as the *Trṣṇā Valley* – the valley of desire. For Mori, the implications of mass social roboticization are not the modern human’s most pressing issue. This is human suffering, which is ultimately caused by *desire*: “the cause of all suffering is rooted in desire.” Mori describes the Buddhist understanding of the process of desire with the analogy of a bomb (which resonates with the pacifistic declaration of Article 9): “one burning desire ignites other desires around it, and the fire spreads as in the bomb. The more we feed desire, the more it grows, until it becomes an explosive form of insatiability” (Mori, 1981, 55). In the graph that follows, Mori plots the point at which the modern human being exists on a scale of “desire.” A “natural” balance exists *in nature*, he argues: “there exists in nature a desire that knows satisfaction – a desire that does not go beyond certain limits. This moderated desire is the principle that underlies the harmonious workings of nature” (Mori 1981, 56). The solid line in the graph represents these ‘harmonious workings of nature,’ as a balance between our desires and their appropriate satisfaction (“supply”) (Mori 1981, 56):



In order to function properly alongside robots, and to welcome humanoid robots in our social world, argues Mori, we must first learn how to control our own desires, our own *trṣṇā* for ultra-existential ego-permanency: we must first learn how to understand and embrace both compassion (*karuṇa*) and nothingness (*śūnyatā*). In his *Loving the Machine: the Art and Science of Japanese Robots* (2006), Timothy Hornyak responds to the question as to why humanoid robots are apparently so loved in Japan: “simply because they are simultaneously science and fiction” (Hornyak 2006, 157). Mori would no doubt agree, but for Mori, the *Buddhist* roboticist, this love results from an insight that humanoid robots are also part and parcel of the *oneness of all things*, of Buddha-nature – of Enlightenment, Compassion and Nothingness/Emptiness.

The conference comments

In 2005, thirty-five years after Mori first proposed the concept of the Uncanny Valley, he was invited to a conference, *Views of the Uncanny Valley: A Humanoids 2005 Workshop*, held in Tsukuba, Japan, which addressed the concept in terms of psychology, sociology, philosophy, neuroscience, and Artificial Intelligence. He sent a letter to Karl MacDorman, the director of the Android Center at Indiana

University, and the one person who has carried out extensive empirical studies on the idea of the Uncanny Valley; Mori declined the invitation, due to prior commitments. In this letter, which has been posted on the net, he states that “while I introduced the notion of the Uncanny Valley, I have not examined it closely too far” (Mori 2005, 1). Nevertheless, he included two short personal observations regarding the concept of the Uncanny Valley, both of which are critical of its original formulation: he is critical of his formulation of both the low point (a corpse) in the curve of the Uncanny Valley, and the high point (the healthy person).

In his 1970 article, the Uncanny Valley is placed between the experience of a corpse and a zombie. By 2005, Mori has changed his attitude toward the corpse. The corpse is no longer an object to be considered “uncanny.” It is now something about which to rejoice: it no longer has to suffer, which is the fate of all *living* beings. The essence of human existence, he states in his first observation, is the fact that humans suffer, and are therefore troubled, which often shows on their faces. Here, Mori uses a Buddhist *trṣṇā* argument to explain why a human corpse should not be viewed as something uncanny, but as something more real than the *living* form of human life-consciousness. He cryptically gives a reason for human suffering, i.e., the very act of decision-making: “if you take one thing, you will lose the other” (Mori 2005,1). Whenever one makes a decision about one’s life, in this way or that, one always wonders whether or not the decision made was the right one. It is as if, with every little decision, one encounters a death of sorts in the choice that was not made. In life, one cannot have one’s cake and eat it too: this is the reality of desire. By contrast, the corpse is free of such desire. Based on a clearer understanding of his Buddhist principles of oneness and compassion, Mori no longer appears, in his 2005 observation, to be struck by the significance of the experience of the uncanny. By way of comparison, Freud, when he was in his sixties, also had a personal observation about the uncanny in his essay on *The Uncanny*. He observed that the older he had become, the less a sense of the uncanny operated as an experiential aspect in his life (Freud 2003, 124).

In his second reflection in the 2005 letter to Karl MacDorman, Mori addresses the “high point” of the curve, the healthy person. Upon reflection, he states, Buddhist statues that bring out the compassionate and healing nature of *enlightened-consciousness* ought to be held as the ideal of human existence, not “the healthy human” per se. He states that the *faces* of the representations of the compassionate nature of the Buddha “are full of elegance, beyond worries of life, and have an aura of dignity” (Mori, 2005, 1). Such artistic representations, he claims, should replace the highest value of “the healthy human” in his 1970 graph.

From these two reflections in 2005, it is clear that Mori is rearticulating his view of both humanoid robots and artificial intelligence that he articulated in *The Buddha in the Robot* – that *all is one* and infused with “*buddha-nature*.” In 2011, at the age of 84, Mori acknowledged the existence of the Uncanny Valley, but simply as a design glitch in the field of humanoid robotics: “To a certain degree, we feel empathy and attraction to a humanlike object; but one tiny design change, and suddenly we are full of fear and revulsion” (Kawaguchi 2011, 1).” This, he says, is what he has described as “the uncanny valley.” Yet, he still articulates the view of humanoid robots and artificial intelligence found in *The Buddha in the Robot*, concerning the oneness of all things:

I call that its “Buddha nature;” robots, plants, stones, humans, they’re all the same in that sense, and since they all have a spirit, we can communicate with them. For example, when a door hinge makes a sound, it’s crying “Please oil me!” I converse with chopsticks: “Thank you!” for letting me use them, I say. They reply, “No problem! This looks delicious! Enjoy!” (Kawaguchi 2011, 1)

Conclusion: Masahiro Mori's Buddhist-based transhumanism – human transformation or human transmogrification?

Based on the preceding discussion, one might conclude that, according to Mori's robotic-engineering-based Buddhist philosophical perspective, the Uncanny Valley is similar to the Buddhist concept of impermanence coupled with its concomitant quality, suffering (*duḥkha*). Like the Buddhist concept of suffering, the Uncanny Valley can be metamorphosed into something transformative. Likewise, Gautama Buddha's experience of sick, elderly and dead humans originally engendered a sense of horrific *uncanniness* in the young princeling, but upon his becoming Enlightened, he viewed such uncanniness as part and parcel of the fabric of this world, the fabric of 'impermanence/nothingness,' which he approached with *compassion*.

While it appears to be the case that all things are One, it also appears that all things are not One, as both Heraclitus and Lao Tzu would commiserate. Human beings appear to live in the dichotomy of being One with all that exists, while also existing as significantly separate from this Oneness. Mori clearly obfuscates this dichotomy, which is a serious philosophical flaw in his thinking when it comes to the existence of humanoid-like AI and robots, given the significance and dignity of *self-identity* qua individuality. As well, as a self-proclaimed practicing Buddhist, Mori appears predisposed to embracing humanoid-like robots and AI on the basis of his predilection for the *anime*-like figure of "the Buddha" as he exists as a phantasmagorical construct in Buddhist hagiography (such as in the *Mahā-Parinibbāna-Sutta*) and in Buddhist iconography. Mori's openness towards the idea that humans ought to give up their humanity as "*humans*" to the "*oneness of all things*" in the guise of robots and AI exhibits the same *naïveté* that he displays in his book *The Robot in the Buddha* concerning the virtues of Buddhism as "the truest, the most perfect, the most universal, and the most magnanimous of religions."

Masahiro Mori can be described as a Buddhist "transhumanist," and as an advocate of transhumanism. Hence, he falls within the fuzzy crosshairs of the "Westernist" historian-of-ideas Francis Fukuyama, who has characterized the philosophy of transhumanism as the world's most dangerous idea – one that aims to "deface humanity" (Fukuyama 2004, 43). Whether the Buddhist-based transhumanism advocated by Masahiro Mori prefigures a utopian human transformation, a dystopian human transmogrification – or both, or neither – only time will tell. But then, time itself is a relative concept, as is the concept of nothingness.

Notes

This article has been translated into Chinese by Shao Ming and was first published in 2012 the *Journal of Yibin University* 12 (8) (August): 1-7. Available at: <http://goo.gl/rbazjX>. (accessed Dec. 10, 2013)

1. The Shinto consecration of robots faded out in the late 1980s, as an official at Kawasaki explained: "We have too many to name now" (Geraci 2006, 8).

2. The word "Karakuri" refers to a mechanical device to tease, trick, or take a person by surprise. It implies hidden magic, or an element of mystery. In Japanese, "Ningyo" is written as two separate characters, meaning person and shape. It loosely translates as "puppet," but can also be seen in the context of a doll or even effigy (Law 1997, 18).

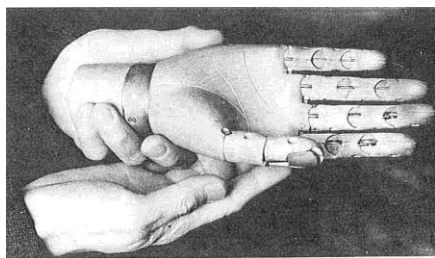
3. Interestingly, in light of Mori's concept of the Uncanny Valley, WWII was precipitated by the Great Depression of the 1920s, which is referred to in Japan as the era of the "Dark Valley" (*kurai tanima*, 暗い谷間).

4. In this context, it should be noted that Fritz Lang's *Metropolis* was released in Japan in 1929, and Karel Čapek's *R.U.R.* was translated into Japanese in the 1930s.

5. Mori's techno-utopianist doppelganger in the West could be viewed as the roboticist/technophile Ray Kurzweil, many of whose significant technological activities (e.g., voice recognition software) have been conducted under the aegis of DARPA (the Defense Advanced Research Projects Agency), the scientific wing of the American military high command. Geraci views the majority of contemporary Japanese roboticists as just as misled as their utopian American counterparts, since both groups are heedless of "the potentially disastrous effects of robotic technology" because of their heady eschatological and soteriological cultural baggage (whether it be a mix of Shintoism-Confucianism-Buddhism or a form of Judeo-Christianity): "even though they may be agnostic or even atheistic, ['pie-in-the-sky'] religion maintains some power over their work" (Geraci 2006, 11).

6. "I belong to the Atom generation," declared Asimo's prime mover, Toru Takenaka, the chief engineer at Honda R&D Co. Ltd. "When I was a child, I loved Atom [Boy] and Tetsujin 28 [another cartoon robot], and I used to be immersed in the robot world (Hara 2001, 1)." As a graduate of the Mukta Institute, Soichiro Honda, the founder of Honda Motors, has developed his company along Mukta Institute principles (Schodt 1998, 209).

7. Mori does not describe the wooden hand as typical of a representation of Avalokiteśvara, the Bodhisattva of Compassion, who also exists in the form of Padmapāni, the One with a Lotus in His/Her (*ardhanārīśvara-rūpa*) Hand, always the left hand. The right hand is often lowered in a compassionate gesture of giving a blessing (a *varada-hasta* as a *varada-mudrā*). The wooden hand sculpted along Buddhist principles appearing in the original Japanese version of the article is just such a hand:



8. Joshua Davis was the digital artist who created the non-Uncanny-Valley Watson avatar:



See: <http://goo.gl/bSJHiG>
(accessed September 13, 2013).

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