

# Social Robots: Fostering Creativity through the Illusion of Life

Karolina Zawieska

**Abstract—** Creativity as we know it, is relatively new to our culture but it has permeated a large variety of fields. Social robotics research is no exception. One of the main approaches towards creativity in robotics involves designing systems that imitate human creativity, in particular the arts. This work, however, discusses the potential of social robots to inspire rather than imitate human creative acts. The key assumption here is that anthropomorphisation is a fundamentally interpretive process, where not only people do perceive robots as alive but they also imagine them as such. This is why anthropomorphisation and disembodied design are seen here as a catalyst for human creativity, with the ability to construct meanings being both the goal and the means of creative activities.

## I. CREATIVITY IN WESTERN CULTURE

For nearly a thousand years, the term “creativity” did not exist at all in European philosophy, theology and arts [17, 18]. In ancient Greece, the goal for man was to discover the laws of nature and submit to them, or serve as a conduit for divine inspiration, rather than invent things. Art was a matter of imitation, rather than creation, seen as the making of things according to the knowledge and application of rules [16, 17]. The only exception was poetry. The poet was the one “who made” and the terms “to make” was what could have been the corresponding term for the then non-existent word “to create” [17]. For the next thousand years, the term “creator” was used exclusively in theology to describe God and the term “to make” and “to create” began to have different meanings [17]. The Christian association of creativity with God’s act of “creation from nothing” is still present in Western culture, to a varying degree. It has been argued that one of the reasons why some people fear or dislike humanoid robots in traditionally Christian Western countries, is that imitation of God’s creation of man may be considered blasphemous [1, 10]. Hence, the common motif of robots which turn against their creators can be seen as punishment for blasphemy.

In the Age of Renaissance (14<sup>th</sup>-17<sup>th</sup> centuries) our worldview gradually shifted from the God-centred to man-centred perspective. It was then that the word “creativity” was applied for the first time to describe the human and not divine act of creation: the Polish poet and theoretician of poetry Maciej Kazimierz Sarbiewski (1595-1640) wrote (in Latin) that the poet “creates anew” and even “in the manner of God” [17]. The term “creativity”, however, was applied exclusively to poetry, and hence

it confirmed the privileged status of poetry art. Since the 19<sup>th</sup> century, the word “creator” entered the language of art [17], with a particular emphasis on the link between creative powers and human imagination. This is how arts has become the main paradigm for creativity [18], being also the main frame of reference for creativity in anthropomorphic robots.

It was not until 1875 when the English word “creativity” was coined, and 1950s when it has gained its current importance and meaning [18]. This is how the concept of creativity began to be applied to the entire human culture and became one of the major values in Western and global culture [16-18]. Despite creativity being largely debated, researched and desired, the ability to “bring new things into existence” [18] continues to defy decisive definitions. In general, anything and everyone can be creative nowadays, including creative industries, creative design, creative problem-solving etc. This is why creativity is also a value in the commercial sense and the terms “creativity”, “innovation” and “invention” are often used synonymously [18]. Social robotics too has been largely concerned with creativity. One of the main approaches involves designing systems that imitate human creativity, for example, robot creating visual art, playing musical instruments, dancing, performing in theatrical plays or presenting poetry and art. As discussed below, another approach implies building robots that inspire rather than imitate human creativity, where the ultimate goal and the means of creative endeavours is the human ability to construct meanings. Such an approach is only possible if we recognise the active role robot users play in creating the illusion of life.

## II. ILLUSION OF LIFE IN ROBOTS

There has been a growing interest in anthropomorphism inside and outside academia, however, the human tendency to anthropomorphise is yet to be understood. In general, depending on our ontological assumptions, we can conceive humanlike robots as machines that actually become human (a strong ontological stance) or only appear to be human (a weak ontological stance) [8]. It must be emphasised, however, that while there is no one definition of life, we all know intuitively whether something is alive or not [4]. Similarly, we know the difference between “human like” and “human”, although grasping such a difference remains a challenge (in social robotics and beyond). From this perspective, the difference between strong and weak ontological claims lies in the literal versus metaphorical understanding of anthropomorphic projections rather than a degree of actual humanness in robots. Thus, social robots become “alive” only if people perceive *and imagine* them as such. Not only is our tendency to anthropomorphise

K. Zawieska is with the SMARTlab/School of Education, College of Human Sciences at the University College Dublin (UCD), Ireland and the Industrial Research Institute for Automation and Measurements PIAP, Poland (e-mail: kzawieska@piap.pl).

“a default schema” originating in human evolutionary history [5], but also it is an activity that largely relies on our imagination and creativity. The main subject of creation is meanings.

### III. MEANING-MAKING AS CREATION

According to symbolic interactionism, one of the main approaches developed within social science, a distinctively human trait is the ability to construct meanings. Symbolic interactionists assume that people ascribe meaning to things they deal with and act based on the meanings those things have for them. Also, people actively construct and modify meanings in the course of symbol-mediated social interaction (in order to be meaningful, symbols need to have shared meanings) [3]. It is important to emphasise, however, that the use of meanings is not a matter of application of meanings derived from social interaction but rather a *process of interpretation* [3]. This is how the ability to make meanings is an inherently creative process. Just as social interaction is essential to the construction of meanings, the creative acts too always take place in a particular socio-cultural context, with social interaction being an important factor influencing creativity [6]. From this perspective, creativity is the goal and the means of both personal and cultural development and a type of symbolic representation that can be taught and learned [13] (for a detailed discussion of the individualist versus social paradigm of creativity see, for instance [6, 7]). This is in line with the dominant view of creativity, where creativity is seen as possible in any domain and can be potentially achieved by anyone and anywhere [18]. For the purposes of this work, it is important to note, that there is no meaning-making without a certain degree of creative imagination and creativity always involves construction of meanings. The two are interconnected and they both emerge out of a complex interplay between the individual and the social world.

Anthropomorphisation too is a fundamentally interpretive process. While anthropomorphic design to a large extent influences people's perceptions of robots, the meaning of such perceptions is always subject to human interpretation. So far, research has shown that robot design plays an important role in creating the illusion of humanness in robots, however, has proven difficult to maintain the illusion over time. This is because anthropomorphic illusions to a large extent rely on human creative imagination, rather than a set of humanlike characteristics implemented in robots: It is the *meaning* we attribute to the robot that makes it humanlike rather than the nature of the robot as such. This is also one of the main reasons why perceptions of social robots vary so greatly between individuals, and robots with even minimal humanlike cues can be perceived as humanlike. There have been a variety of studies that explore iconic versus realistic robot design, and hence recognise the active role human imagination plays in creating the anthropomorphic illusion. However, the use of anthropomorphic robot design as the means to foster human creativity and the ability to make meanings, is yet to be understood.

### IV. DISEMBODED ROBOT DESIGN

As technology advances, the number of human characteristics imitated in robot form and function grows. A common frame of reference for different anthropomorphic traits is human sociality and social interaction. This is to a large extent due to increasing recognition of the social nature of the core human qualities, among which are intelligence, cognition and emotions. Also, there has been a growing interest in the embodied nature of human traits and experiences, with a number of research approaches rejecting mind/body dualism. Such physical and social embodiment has been widely embraced by social robot designers. In general, the humanlike body has been recognised as a crucial factor for successful human-robot social interaction and the primary means to achieve anthropomorphism. Physical embodiment is also one of the distinctive features of robots. This is why not many robot designers have gone beyond the principle of embodiment and developed disembodied design. Disembodied robots are partially virtual agents or robots having only some body parts (e.g. [9, 11, 14]), or, if pushed to the extreme, robots with no bodies at all [15]. Some researchers describe robot heads in terms of disembodied design, however, they are seen here as a distinct robot category. The main focus of research into disembodied design is the role of physical versus virtual embodiment in facilitating human-robot interaction and increasing the anthropomorphic illusion, in particular a sense of robot's social presence. Disembodied robots show that, as technology often fails to meet people's expectations towards highly realistic robots, it is human imagination that best meets the anthropomorphic design challenge. Not only do such studies support the view of anthropomorphisation as the interpretative and imaginative process but they also raise interesting questions regarding the goals for disembodied robots.

### V. QUEST FOR MEANING AND CREATIVITY

While building a highly realistic humanoid remains one of the greatest challenges, iconic robot design too has been widely used in social robotics. Disembodied robots can be seen as a part of iconic design, where a social robot only vaguely resembles a human being. Such robots leave room for human imagination to complete the anthropomorphic illusion of life. The other way to approach disembodied design, however, is to use it as a tool to deliberately foster human creativity and imagination. In such a case, the main assumption is that human creativity, the ability to make meanings and anthropomorphism share a number of qualities that can become guidelines for robot design:

- *Self-conceptions*: Meaning-making (and thinking as such) is possible due to our ability to distinguish between things and their meanings [2], i.e. going beyond our physical and sensual experiences. Just as we distinguish objects and their meanings, we also make a distinction between objects and ourselves. This is how the ability to create meanings is of crucial importance for the development of the human mind and identity. Anthropomorphic robots also require us to reflect on ourselves and our conceptions of man that is often

taken for granted. Disembodied design, far from being clearly anthropomorphic, aims to foster our creativity regarding the subject we are all fundamentally interested in and in the area where we all are creative: the meanings of what is means to be human, and humanlike.

- *Social interaction*: Social interaction is of crucial importance for our ability to create and the ability make meanings, and so it is for human-robot interaction. While robot form and function are subject to carefully planned design and control, the process of social interaction is clearly less controlled. This is where a subtle balance can be achieved between guiding and freeing user creativity.

- *Conflict*: As long as our action with respect to objects proceeds uninterrupted, we are unaware of the meaning of these objects. However, as soon as an object calls out conflicting tendencies of action, we are challenged to reflect on its meaning [12], and in many cases create a new one. Given the robots' effect "the uncanny valley", anthropomorphic and disembodied robots may significantly foster the process of meaning-making and creative interpretation. The conflicting tendencies refer to our conceptions of humanness vs. human likeness in robots.

## VI. CONCLUSIONS

While there is no one definition of creativity, there is a general recognition of creativity as good [18]. This work too advocates creativity for the reasons that link creativity with the human capacity to construct meanings. If there is no easy solution for social robot design, it is because the anthropomorphic illusion relies on the meanings we attribute to robots and our imagination, in particular if the illusion is to be maintained over time. This is why, rather than see anthropomorphic robots as creative entities themselves, we can use them as a tool to understand and foster human creativity and imagination. Anthropomorphic robots in general, and disembodied robots in particular, can inspire people to construct fundamentally new meanings as well as challenge the existing understanding of what it means to be human and ourselves. Also, using social interaction as the main frame of reference for robot design allows robots to embrace the social nature of human creativity and the ability to make meanings. This is how humanlike machines can help people to be distinctively human.

## REFERENCES

1. Bar-Cohen, Y., A. Marom and D. Hanson, *The Coming Robot Revolution: Expectations and Fears About Emerging Intelligent, Humanlike Machines* 2009: Springer.
2. Biesta, G.J.J., *Mead, Intersubjectivity, and Education: The Early Writings*. Studies in Philosophy and Education, 1998. **17**(2-3): p. 73-99.
3. Blumer, H., *Symbolic Interactionism: Perspective and Method* 1986: University of California Press.
4. Brooks, R.A., *Steps Towards Living Machines*, in *Int. Symposium on Evolutionary Robotics From Intelligent Robotics to Artificial Life* 2001, Springer-Verlag. p. 72-93.
5. Caporael, L.R., *Anthropomorphism and Mechanomorphism: Two Faces of the Human Machine*. Computers in Human Behavior 1986. **2**(3): p. 215-234.
6. Edmonds, E., L. Candy, G. Cox, J. Eisenstein, G. Fischer, B. Hughes, and T. Hewett, *Individual and versus Social Creativity*, in *3rd Conference of Creativity & Cognition* 1999. p. 36-41.
7. Glăveanu, V.P., *Paradigms in the study of creativity: Introducing the perspective of cultural psychology*. New Ideas in Psychology, 2010. **28**(1): p. 79-93.
8. Kahn, P.H., H. Ishiguro, B. Friedman and T. Kanda. *What is a Human? - Toward Psychological Benchmarks in the Field of Human-Robot Interaction*. in *15th IEEE Int. Symposium on Robot and Human Interactive Communication* 2006.
9. Kose-Bagci, H., E. Ferrari, K. Dautenhahn, D.S. Syrdal and C.L. Nehaniv, *Effects of Embodiment and Gestures on Social Interaction in Drumming Games with a Humanoid Robot*. Advanced Robotics, 2009. **23**(14): p. 1951-1996.
10. Lee, H.R., J.Y. Sung, S. Sabanovic and J. Han. *Cultural Design of Domestic Robots: A Study of User Expectations in Korea and the United States*. in *21st IEEE Symposium on Robot and Human Interactive Communication* 2012.
11. Lee, K.M., Y. Jung, J. Kim and S.R. Kim, *Are physically embodied social agents better than disembodied social agents?: The effects of physical embodiment, tactile interaction, and people's loneliness in human-robot interaction*. Int. Journal of Human-Computer Studies, 2006. **64**(10): p. 962-973.
12. Mead, G.H., *Suggestions Toward a Theory of the Philosophical Disciplines*. The Philosophical Review, 1900. **9**(1): p. 1-17.
13. Moran, S. and V. John-Steiner, *Creativity in the Making: Vygotsky's Contemporary Contribution to the Dialectic of Development and Creativity*, in *Creativity and Development*, R.K. Sawyer, V. John-Steiner, S. Moran, R.J. Sternberg, D.H. Feldman, J. Nakamura, and M. Csikszentmihalyi, Editors. 2003, Oxford University Press.
14. Osawa, H., T. Voisin and M. Imai, *Partially Disembodied Robot: Social Interactions with a Robot's Virtual Body*, in *Social Robotics. 4th Int. Conference on Social Robotics*, S.S. Ge, O. Khatib, J. Cabibihan, R. Simmons, and M.A. Williams, Editors. 2012, Springer. p. 438-447.
15. Patridge, M. and C. Bartneck, *The Invisible Naked Guy: An exploration of a minimalistic robot*, in *1st Int. Conference on Human-Agent Interaction* 2013.
16. Sternberg, R.J., *Handbook of Creativity* 1999: Cambridge University Press.
17. Tatariewicz, W., *A History of Six Ideas: An Essay in Aesthetics* 1980: Kluwer Academic Publishers.
18. Weiner, R.P., *Creativity and Beyond: Cultures, Values, and Change* 2012: SUNY Press.