Human, too human?
Experience, Learning, Interaction with AI

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Abstract

The contribution addresses the topic of interaction with AI with the aim of investigating the importance of interface characteristics for the acceptance of and interaction with produced innovations, with a special focus on social robotics. While on the one hand the realisation of anthropomorphic products would seem to facilitate interaction, on the other hand the analysis of the literature conducted has revealed ambivalent reactions towards AI applications characterised by traits that are far too like humans. The importance of the contribution lies in emphasising the need to keep the two components, the artificial and the human, separate to foster an interactional and communicational exchange destined to become increasingly frequent in the future, as is already the case in most social contexts. The multiplication of the spheres of interaction between humans and AI embodied in social robots makes it possible to consolidate a partnership with interesting developments from an epistemological point of view and with possible applications in which two intelligences of different natures, organic and inorganic, can for the first time work together to produce knowledge. The pairing of social robots with humans makes it increasingly clear that it is possible to work in integrated and mixed teams composed of different types of actors, which already demonstrate interesting levels of effectiveness in work and training. However, these considerations also give rise to the need to reflect on the training possibilities for individuals and social groups characterised by individuals who are not necessarily adequately prepared to interact with the AI embodied in social robots. Thus, from the scenario outlined emerges the need to review the canonical theoretical frameworks of the sociological tradition, founded on the study of relations between human beings, as a horizon rich in epistemic opportunities is discovered from the emergence of new forms of interaction between human and non-human. Hence the need to search for a theoretical conceptual framework within a phenomenological perspective, declined in this work in a symbolic interactionist key.

Keywords: AI; interaction; epistemological frameworks; social theory

Introduction

When the first steps towards a *social robotics* (*sr*) were taken, they started from a dream, an idealised image of the relationship with *social robots* (SR)[1], assumptions that

[1] Zawieska et al., 2012, pp. 78-82.

were only clear from a theoretical point of view[2]. A few decades after the first tests, the results of this relationship are not slow to show themselves, so much so that the most recent developments in Artificial Intelligence (AI) bring these results closer to the dream from which they started, allowing experiments in the most diverse contexts to continue without setbacks. The possible applications are manifold in numerous fields, where *integrated and mixed teams*, composed of humans and SR, show effectiveness in the acquisition of *knowledge*, the ability to finalise personal projects, adaptation to teamwork and the development of social skills[3].

The multiplication of the spheres of interaction between humans and AI embodied in SR makes it possible to consolidate a partnership that presents interesting developments from an epistemological point of view and paves the way for new applications in which, for the first time, two intelligences of different natures, organic and inorganic, collaborate to produce *knowledge* together[4]. From this point of view, the practical aspects of the report emphasise the urgency of revising the paradigms on which the sociological tradition is based, within which reflections have so far only concerned relations between human beings. In particular, the pervasiveness of *sr* opens up major scenarios, given the need to consider educational interventions aimed at increasing the number of subjects aware of the opportunities for interaction with AI: hence the need to work on interactive processes, since not only professionals and programmers will be involved, but also non-experts, who need appropriate training supports for the use of AI. This aspect is not insignificant and represents one of the most important challenges that *sr* must face, since the design of the interface does not only depend on the specific target of the application, but also requires broader considerations on the *culture* of the user to whom the system is addressed.

Based on these premises, the contribution aims to investigate how humans can interface with SR. If it is true that the *empathic relationship* with SR is supported by a greater resemblance to the human in terms of features and behaviour[5], the issue of estrangement in the presence of entities that are clearly distinct from our species[6] nevertheless remains to be addressed. Therefore, starting with a review of studies in the cognitive field, this article analyses *human-robot interaction* (HRI) from a sociological perspective in order to understand how *social skills* and *embodied corporeality* influence the relationship. At this stage of anticipation of technology diffusion, where reactions act as drivers of evaluations, experiments follow the path of *humanisation*, given the idea that resemblance to humankind can facilitate empathy towards robots[7].

[2] Breazeal et al., 2016, pp. 1935-1972.

[3] Belpaeme et al., 2018; Fuglerud et al., 2018, pp. 401-440.

[4] Ienca, 2019.

[5] Leite et al., 2013, pp. 250-260.

[6] Mori, 1970, pp. 33-35.

[7] Mathur, & Reichling, 2016.

The question with this work is whether this is really the case or whether humanisation can lead to undesirable effects such as rejection and rejection[8]. As will be noted at the end of the analysis, the importance of the contribution lies in the search for an appropriate theoretical framework for the study of interactions with AI, drawing on the ability to sociologically imagine[9] the possible new *rituals of interaction*[10].

Experience, learning and interaction

As pointed out in the previous section, mastery of social rules is relevant for an empathic relationship with SR[11]. Other important attributes are pointed out by Darling, who describes SR as «autonomous agents with a physical body that communicate and interact with humans on an emotional level. It is important to distinguish SR from inanimate computers as well as industrial or service robots, which are not designed to elicit human feelings or mimic social signals. SR follow social behaviour patterns, have various "mental states" and adapt to what they learn through their interactions»[12]. According to this interpretation, SR position themselves as interaction partners, based on the appearance, reference patterns, mechanisms that preside over movement, linguistic reactions and interactive performance for which they are programmed.

In her examination, Williams[13] emphasises the importance of *social intelligence*, identifying the cognitive capacities required: the concept of self, the ability to distinguish between voluntary and involuntary behaviour, the explanatory and predictive ability of one's own and others' behaviour, the understanding of mental states, the ability to determine behaviour, and the motivation for purpose; no less important is the ethical-legal element, which can be seen in a *deep social awareness*. In this sense, SR are configured as *learning systems*, in that they not only store the information they detect, but also process the knowledge in accordance with a multi-layer system that enables them to formulate evolved responses, in line with the behavioural model formed through this process. Machine learning-based learning[14] allows automata to obtain information on which to fix *experiences*, from which they can classify language, facial expressions and identify emotions, comparing the numerous examples accumulated in the memory-archive. Despite this ability to adapt the algorithm to various realities through action patterns that can be linked to a precise logic, SR cannot autonomously produce patterns that are not an expression of the programmers' will. This means that any programming error could cause a misjudgement of the situation

[8] Giger et al., 2019.

[9] Mills, 1959.

[10] Goffman, 1974, 1988.

[11] Dumouchel, & Damiano, 2019.

[12] Campa, 2016, pp. 106-113.

[13] Williams, 2012, pp. 45-55.

[14] Fossa et al., 2021.

and a misunderstanding of the frames of interaction, as well as distortions in learning behaviour.

In order to study reactions to the presence of SR, Mathur and Reichling[15] conducted a betting-centred survey aimed at identifying possible relationships between appearance and the trust accorded to SR. The results show that subjects tend to trust SR with an appearance similar to their own more than those with non-biomorphic appearances, who actually receive less credit in the experiment. This would show that humans tend to be more willing to establish friendly relationships with humanised robotic entities, as they perceive greater trust in that which is similar to them. Such evidence highlights how the issue of appearance is crucial for interaction design, given the greater inclination people seem to have towards human-like mechanical entities.

Talking about humanisation allows us to delve into the topic of *anthropomorphism*, making it clear that it is one thing to allude to *anthropomorphic forms*, the outcome of design, and quite another to refer to the cognitive process of projecting human attributes onto animals, objects, celestial bodies and technological artefacts[16]. This tendency is a common feature of humankind and its theoretical components can be found in computer science and AI as well as in religion, linguistics, philosophy and marketing. Research on the topic indicates a relationship between the need to be a competent social actor and anthropomorphisation, corresponding to the need to master the environment in order to reduce the unpredictability of others[17]. In this sense, anthropomorphisation represents a process of inductive inference, through which people associate the real or imagined behaviour of other actors with human-like characteristics, motivations, intentions and mental states, including higher-order processes such as self-awareness. The nuances of this phenomenon are many: there are situations and creatures that encourage it more than others, just as children have a more pronounced aptitude for anthropomorphisation than adults. This disposition is also applied to people who are intended to be treated as objects or animals. Then there is the relationship between anthropomorphisation and sociality to consider, especially in individuals who, experiencing loneliness, seek to establish a connection with non-human beings. Likewise, SR are humanised, especially when the behaviour of the interactant is considered unpredictable. This anthropomorphisation can be understood as a strategy aimed at reducing the perceived disorientation in the face of a complex cultural reality, in which the technological advances produced by digitisation can make it difficult to manage the information one comes into contact with on a daily basis: in this way, the technology would be more engaging, stimulating and credible with respect to the programmed objectives.

[15] Mathur, & Reichling, 2016, pp. 22-32.

[16] Giger et al., 2019, p. 112.

[17] Waytz, & Young 2014, pp. 278-283.

If what has just been said leads one to argue for the necessity of identifying the characteristics of *sr* recipients before proceeding with programming, it at the same time prompts necessary considerations about the ambivalent effects of this predisposition to anthropomorphise other creatures, robot included. In fact, these findings should be complemented by Mori's[18] argument about the effect of alienation experienced due to a resemblance that goes beyond the limits of endurance, which the Japanese scholar describes with the Uncanny Valley model. According to his interpretation, the realisation of robot with anthropomorphic forms has certain advantages, evident as long as the resemblance to the human remains under a threshold of control; beyond which, the overlapping of human and robotic connotations crosses the limits of acceptability, resulting in an undesirable effect contrary to the intention to see the AI-supported technology accepted, since the identification with otherness gives way to bewilderment. This emblematic aspect refers to the sense of bewilderment and frustration one feels when confronted with a being other than oneself, whose physicality does not present perceptible separation boundaries to the human gaze. Figure 1 shows how the course of the reaction curve in the face of other beings collapses in the transition from industrial and playful robotics to one understood as a biomechanical extension of the human body.

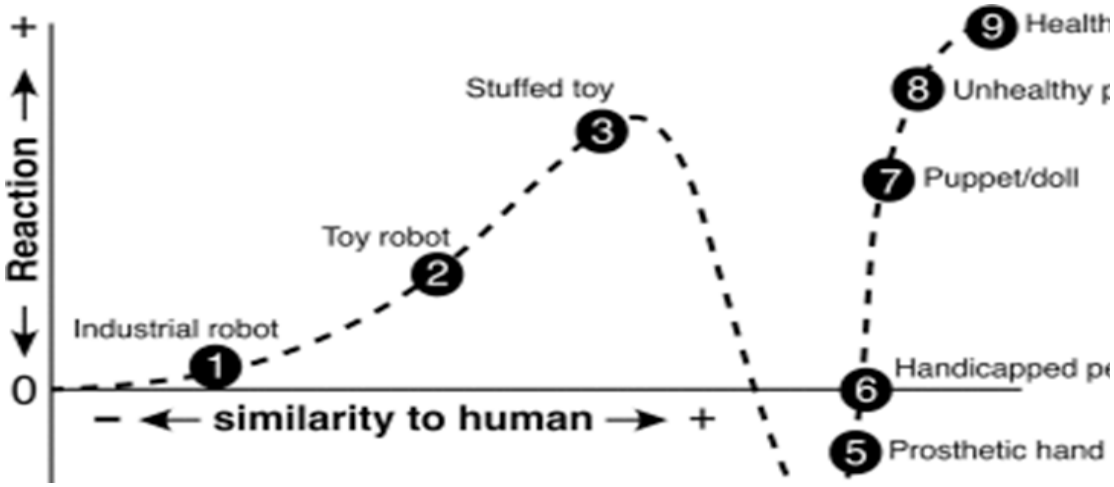

Figure 1 – The Uncanny Valley Model
Source: Mathur M.B., & Reichling D.B. 2016.

Indeed, the thesis put forward by Mori makes it possible to consider the implications of the use of SR in an exaggeratedly human-like aspect: a discourse not without consequences for the repercussions on the epistemological side, given the

[18] Mori, 1970, pp. 33-35.

pervasiveness of SR in every sphere of the world of life[19], not least the field of research, where experiments present encouraging results in the field of surveying[20].

Human, too human?

In recent decades, SR have become strikingly similar to humans, not only in appearance, but also in psychological, affective and behavioural characteristics: they are so in language, emotions and personality. The implicit assumption of such developments would seem to be based on the idea that similarity facilitates interaction with AI, enhancing the acceptance of an innovation that is bound to change the theoretical frameworks of a discipline such as sociology, which has always been founded on the study of relationships between beings of the same kind. *Humanisation* is not only about bipedality, but also about characteristics such as gender and race, including social (non-verbal behaviour, emotions, empathy), ethical (morals, values) and spiritual (religion, culture, tradition) skills. In general, such humanisation follows a double track, consisting of a top-down, anthropocentric mode. On the one hand, there is a reproduction of the human as an end in itself, and on the other a bottom-up one aimed at the realisation of reproducible relationships, regardless of appearances, thanks to typological characteristics that facilitate HRI, i.e. physical (hair colour, eyes, lips, limbs) and micro-attitudinal requirements, such as tone of voice, gaze and gestures. Hence the enhancement of the ability to infer human attributes through observation, starting with knowledge of oneself and other beings.

Table 1 presents a summary of the main effects associated with humanising SR in the educational context, established by the authors[21] on the basis of the positive vs. negative dichotomy. On the side of the favourable aspects, research shows improvements in educational activities in the presence of an empathic SR, perceived as a friend, even if he/she is a classroom tutor, provided that he/she manifests human imitative behaviours[22]. Furthermore, learners are more likely to perceive the content of a story when the story is told by a SR using complex communicative registers, through the application of different voice tones, than when the story is told by an R using a speech synthesiser[23]. Finally, SR who can laugh and tell jokes are considered more engaging partners due to humour[24].

[19] In *The Crisis of the European Sciences and Transcendental Phenomenology* (1954), Husserl addresses the theme of the crisis of contemporary society by identifying its causes in positivist reductivism, which, in his opinion, indicated the Galilean model as the only possible scientific model. In this context, the philosopher enunciates his conception of the life-world, a concept that is fundamental for the repercussions that, on an epistemological level, it produces on the understanding of cognitive processes, together with that of intentionality.

[20] Brignone et al., 2022, pp. 182-183.

[21] Giger et al., 2019, p. 113.

[22] Alves-Oliveira et al., 2016, pp. 817-822; Baxter et al., 2017.

[23] Westlund et al., 2017, p. 295.

[24] Niculescu et al., 2013, pp. 171-191.

TABLE 1 Taxonomy for negative and positive aspects of humanizing social robots

Humanization type	Positive aspects	Negative aspects
Psychological	• Interaction engagement • Wellbeing benefits • Educational benefits • Increased motivation • Higher perceived support • Increased social connection	• Overtrust and unrealistic perceptions of a robots' autonomy and capabilities • Attachment issues • Existential threat
Physical	• Increased social interaction • Higher perceived assistance • Higher proximity	• Feelings of eeriness or discomfort
Functional	• Economic gains • Frees humans from dull tasks • Frees humans from dangerous tasks • Increased precision (e.g., health), and reaching places otherwise inaccessible (e.g., deep sea; space, disaster exploration)	• Unemployment • Requires human supervision • Creates demands for the acquisition of new skills (e.g., doctors who work with surgical robots need to know how to operate the robots).

Table 1 – Taxonomy for negative and positive aspects of humanizing social robots
Source: Giger et al. 2019.

On the critical side, however, researchers note a certain mistrust of humanised R, which is expressed through ambivalent feelings. In this regard, a survey carried out in the European Union highlighted the opinion of those who consider SR to be machines to be entrusted with dangerous tasks such as space missions, military, security and rescue operations, but not the care of children, the elderly and the disabled[25]. Although people consider SR suitable for household chores, they state that they feel uncomfortable with the idea of interacting with them[26]. A study in this direction found

[25] TNS Opinion & Social, 2014.

[26] Carpenter, 2023, pp. 77-92.

an increase in blood pressure in those who were asked to think about humanoids, more so than in the control group who were asked to think about mechanical R[27]. In addition, there is indicative evidence of different perceptions of R-types tending towards the human: while people find mechanised-looking androids more sympathetic, they also state that they are less likely to interact with humanoids, which, imitating human uniqueness, are perceived as a potential threat[28]. Furthermore, an analysis on YouTube showed that humanoids receive significantly fewer positive comments than less human-like R[29].

Conclusion

The pairing of AI with the human species has become increasingly common in everyday life. With this contribution, whose reference is to SR as autonomous entities embedded in society to assist human beings in the performance of operational and intellectual tasks, realised to respond to real complexity according to co-adaptive and co-evolutionary behavioural patterns, we addressed the issue of interaction to understand how elements such as *social skills* and *corporeality embodied* in the SR can interfere with the relationship. Regarding the first aspect, people tend to be more accepting of SR designed as sociable partners[30], equipped with a *learning system* that allows them to make use of *social intelligence*[31]. In the educational context, for example, children develop a trust-based empathic relationship primarily with SR who are perceived as fun and friendly[32]. Embodied corporeality is a requirement sought in the attempt to promote acceptance of *sr* through humanisation and empathy[33]. In formulating our hypotheses, we asked whether humanisation is indeed an element that facilitates interaction. While the tendency to find oneself in the other through

[27] Johanson et al., 2021, pp. 1835-1850.

[28] Rosenthal-von der Pütten et al., 2014, pp. 67-83.

[29] Strait et al., 2017, pp. 1418-1423.

[30] Breazeal et al., 2016, pp. 1935-1972.

[31] Reeves, & Hancock, 2020; Williams, 2012.

[32] Alves-Oliveira et al., 2016; Baxter et al., 2017; Niculescu et al., 2013.

[33] Leite et al., 2013.

intersubjectivity[34] soothes the anticipatory anxiety[35] felt prior to the relationship, reducing the sense of frustration that would result from perceiving the other as a potential threat[36], over-humanisation may reduce the chances of acceptance and interaction with robotics[37]. The outcomes of the tests considered show that reactions towards humanoids can generate mixed feelings, whereby people are more likely to associate with mechanised-looking SR[38], which are considered funny, amusing and reassuring: hence the inference that excesses of humanisation do not facilitate interaction. A confirmation of what has been argued here comes from the forecast Mori's[39] model, which reveals the perceived alienation effect towards robotics, perceived as a biomechanical extension of the human body. The idea that emerges from this analysis is that interaction with SR might be characterised by rejection[40], rather than acceptance[41], when the robotic component is indistinct from the human one, probably because people feel the need to safeguard the uniqueness of human nature rather than compromise it[42].

In summary, interaction with AI represents a major epistemological breakthrough in sociology, as it leads to a reshaping of traditional theoretical frameworks, due to encounter with an otherness of a different nature. As far as *human-computer interaction* (HCI) is concerned, Reeves and Hancock[43] explain that people treat computers as if they were individuals, provided the technology displays *social skills*. These results suggest that social behaviour appropriate to *interaction frames*[44] can facilitate interactions with computers. This implies that the more the SR display an

[34] According to the phenomenological perspective, of which Edmund Husserl (2017) and Alfred Schütz (1974, pp. 134-135, 1979, pp. 11 ff.) were eminent exponents, consciousness is a reality that never presents itself in immediate relation to itself, since it can only reflect on itself through the mediation of external and internal objects with which it is in connection. While consciousness is revealed in its intentionality as an activity constitutive of objects, this activity always develops within a relational sphere, in the relationship with things and with others. Therefore, according to this conception, knowledge does not present itself as an adaptation of the subject to the object, but rather as a circular process in which the subject interprets the object and this interpretation retroacts on the subject, becoming a constitutive part of its subjectivity. It is in this way that, according to the phenomenologists mentioned, an objective, intersubjectively shared social world is constituted.

[35] The anticipatory anxiety mentioned by Garfinkel (1967, pp. 69-70) concerns the feeling actors experience when they know they are violating rules of conduct, exposing themselves to more or less severe consequences for their deviant behaviour. In this contribution on the subject of interaction with AI, the concept is extended to the perceived feeling towards interaction partners that are believed to be dangerous.

[36] Waytz, & Young 2014, pp. 278-283.

[37] Giger et al., 2019, pp. 115-116.

[38] Rosenthal-von der Pütten et al., 2014.

[39] Mori, 1970.

[40] Johanson et al., 2021, pp. 1835-1850; Carpenter 2023, pp. 77-92; Strait et al., 2017; TNS Opinion & Social, 2014.

[41] Mathur, & Reichling, 2016.

[42] Giger et al., 2019, p. 116.

[43] Reeves, & Hancock, 2020.

[44] Erving Goffman (1974, 1988) interprets real life as a ritualised theatrical performance according to the reversal/backstage model, in which the protagonists of the action exhibit their selves by reconfiguring them according to the frames in which they interact. Such dramatisations have a decisive effect on the participants, who contribute to creating a shared social reality, reproduced and validated on the basis of the trust that the actors instill in the symbols produced and, in the relationship, considered as a sacred object of a cult to be celebrated.

attitude towards the norms, customs, values and ideals that characterise the cultural context in which they are embedded, the greater their *social acceptance*. In this sense, SR pose important new challenges in terms of *sociality*[45], since they lend themselves to communicative and symbolic exchange, especially if supported by a suitable communicative register that reduces the need for continuous training. This would lead to the conclusion that people will interact more with robots capable of posing as sociable partners[46], able to make the interaction flow thanks to a context-appropriate *definition of the situation*[47]. In this process of interaction, the ethnomethodological frameworks established by Harold Garfinkel[48], in which the concepts of *indicality* and *reflexivity* are embedded, could be useful. The former refers to the need to make explicit the situational context of the interaction in order to understand its meaning. According to the author, the social world is a complex of indicalities taken for granted, on which individuals rarely reflect, in order to avoid incessant pursuit of objectivity at all costs. The second concept refers to the tendency to interpret situations as instances of something more general, even if this something never actually transpires. According to Garfinkel, action is thus an example of a general pattern, knowledge of which is assumed, without actually encountering such a guiding pattern for social action in real life.

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