Representing Robots in Popular Culture

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In 2016, Sophia - an anthropomorphic robot which like others is characterized by a female identity, produced by Hong Kong-based engineering and robotics company Hanson Robotics - sparked significant interest in the public sphere. It was invited for interviews by numerous news media and TV shows, including *Good Morning Britain*, CBS' *60 min* and Jimmy Fallon's *Tonight Show*, performing the role of a media-aware mechanical guest. The spectacular representation of interviews with Sophia was staged through a careful choreography, adapting the performance to the specific media environment in which the robot made its appearances and replicating established representations of robots in the public sphere (Parviainen & Coeckelbergh, 2020). Since her activation, moreover, Sophia has been pictured on the covers of many fashion publications, presented on various runways and starred in a Moncler advertising campaign. In the vast communication campaign regarding this robot, fashion would have the function of making their perception by the public more 'human': warmth and experience (but not competence and efficiency) are seen as human key characteristics that are lacking in machines. Sophia is a full-blown case of the fact that feminine gendering might be used to humanize robots (Borau, Otterbring, Laporte & Fosso Wamba 2021; Fortunati, Sorrentino, Fiorini & Cavallo, 2021).

Although Sophia and Hanson robotics have been widely criticized for misleading the public about the robot's capabilities, its media exposure remains paradigmatic of the close relationship between robots and popular culture. Throughout the history of robotics, robots have always inhabited both the realm of scientific laboratories and the realm of popular representations. The very word *robot*, in fact, originated not in the context of computing or engineering as in the context of spectacular entertainment: the term was introduced by Czech novelist and dramaturgist Karel Čapek in his 1920 theatrical play, *Rossum's Universal Robots* (Čapek, 1990). Robots have always been highly debated objects, loaded with values and symbolism, represented in films and novels. Robots and robotics are an object of public discussion, a technological novelty towards which we are called upon to take a stand, an object of social representations processes (Fortunati,Sarrica, Ferrin, Brondi & Honsell, 2018; Höeflich, 2013). And the relationship between scientific and popular representation is biunivocal. On the one hand, these technological objects embed the representations and knowledge that designers, engineers, programmers have of what a robot should look like, and of the desired robot-user interactions in society (Sabanovic, 2010). On the other hand, by introducing robots in societal context, cultural agents reproduce and create new visions of humans and robots. For example, in recent years, in the fashion shows of various brands the release of new models has been accompanied in different ways by the presence of robots. The effect of this staging had the main purpose of creating an aura of surprise and disquiet or exaltation for the co-presence of humans and androids. Technology applied to garments, however, does not only have a function dedicated to improve or help physical and biological performances. It is also a means for promoting technology: when exhibited, it becomes fashion in turn (Danese, 2015).

As shown by the case of Sophia as well as by many other contemporary examples in which prototypes and commercial robots became the center of the stage, therefore, it is impossible to understand the presence of robots in contemporary societies and cultures without considering the plethora of representations that accompany them. To address and contextualise such representations, in the first two sections we mobilise research and theoretical frameworks within socio-psychological, media and cultural studies that look at the intersection between individual attitudes, social representations, popular culture and technology. In the last section of the chapter, we use fashion as a specific case in which the reciprocal promotional action produced around androids contributes to reproduce and transform the representations of robots and of humans with them.

Acceptability and acceptance

The studies which focus on the users' attitudes towards robots are often framed -in analogy with other approaches to technological advances- in terms of (a) acceptability, (b) acceptance, and (c) appropriation (David, Thérouanne, & Milhabet, 2022). These studies are often criticized for a passivizing approach of the user: the reaction is investigated only downstream of the technological device that is either finished or in an advanced state of design. By contrast, other approaches (e.g. co-design, open design, community informatics) stress the need to start from needs of individuals and groups and to follow a culturally sensitive approach, involving individuals and communities right from the conception phase (Sabanovic, 2010; Farinosi et al., 2023). Moreover, since the actual possibility of encountering social robots is scarce, the aim of these studies so far has mainly been trying to anticipate how people may react to these new technologies. Consequently, research has focused on exposure and interaction in experimental settings or on respondents' mental representation of what the social robots are or will be.

To understand acceptability and acceptance, researchers examined a number of distal and proximal determinants of attitudes towards robots as well as intentions to use them. Robots have been treated as stimuli capable of activating perceptual and evaluative processes in the final users (such as in the case of anthopomorfization, Waytz, Morewedge, Epley, Monteleone, Gao & Cacioppo, 2010). Measures such as UTAUT (Unified Theory of Acceptance and Use of Technology, see Venkatesh, Morris, Davis & Davis, 2003) or TAM (Technology Acceptance Model, see Davis, 1989) have been adapted to understand predictors of attitudes towards this specific technology (Carradore, 2022). Measures such as the GAToR (General Attitudes

Towards Robots) scale have been developed ad hoc (Koverola, Kunnari, Sundvall & Laakasuo, 2022). At European cross-national levels, the attitudes of aggregates of respondents have been explored as well by Eurobarometer (e.g., Eurobarometer, 2012; 2015).

Age, gender, education, area of living, social class familiarity with technology, perceived competences, values, etc. (for a systematic review see Naneva, Sarda Gou, Webb & Prescott, 2020) all proved to have relevant effects on acceptability and acceptance of robots. A number of studies have been dedicated to groups of specific interest such as children (Stower, Calvo-Barajas, Castellano & Kappas, 2021), the older adults (e.g., Taipale, de Luca, Sarrica & Fortunati, 2015; Jecker, 2021), and in different environments, educational and healthcare contexts above all (Carradore, 2022; Di Battista, Pivetti & Bozzi, 2022; Di Battista, Pivetti & Moro, 2022; Tavakoli, Carriere & Torabi, 2020).

Predictors such as the perception of human likeness (e.g., Halpern & Katz, 2014), or the physical distance between robots and humans (e.g., Kim & Mutlu, 2014) have been largely investigated. A recent scoping review suggests that individual acceptance after interaction increases (David et al., 2022). And, in the future, we could expect that a growing inclusion of robots in everyday contexts could activate processes foreseen by the diffusion of innovation theories. However, at present, many studies show that the users' preconceptions about what robots are and about their capacities are key to understanding the first experiences of interaction with them (e.g., Smarr et al., 2014). Being represented as animals (Coekelbergh et al., 2010), out of human control (Wolbring & Yumakulov, 2014), or as instrument-like (Eurobarometer, 2012; 2015), anticipated robots already pre-figure the range of interactions that could be acceptable and positive. In this sense, differences in acceptability and acceptance don't depend merely on the quality of the technological device but are also related with the way the relationship between self and object is represented. The anticipated relationship with a funny toy, a potential competitor, a stupid computer, or an artificial intelligence contributes to determining the way the relationship is enacted within diverse domains of use. In this framework, for example, we can understand the challenge that the social robots pose to the social representation of robotics as destined for dull, dangerous and dumb tasks. As we already said, AI and social robots challenge and subvert first and foremost the dialectic between dominant or cooperative relationships and between productive and reproductive spheres in human-machine interaction (Taipale et al., 2015).

For our purpose, it is interesting to note that the measures of the classic components of attitudes (i.e., cognition, affective and behavioural dimensions), as well as the *ad hoc* measures (e.g., Anxiety towards robots) often go beyond a rational assessment of individual knowledge and perceived usefulness and usability. As Koverola et al. (2002) clarify: "At a personal level, hopes and fears are felt as innate, visceral reactions. One simply likes playing with a robot or shudders at the thought of touching one without a need to rationalize the feeling. At a societal level, we can worry about robots replacing humans at the workplace, thus creating unemployment, or hope that increasingly smart automatic driving systems will result in fewer traffic accidents, thus easing the burden on health care systems. Societal-level hopes and fears are based at least partly on information received from outside the self, i.e., learned." (p. 1560).

Such an idea of individual innate or immediate reaction to robots clearly goes back to the stimulus-reaction approach. Although we do not fully agree with this perspective, it is clear that, even from this point of view, expectations at the societal level require a more sophisticated understanding of which information circulates in the social arena.

Social representations

Among the other culturalist and constructivist perspectives, the social representation theory (SRT) takes a specific stance which proved to be useful to examine the social construction of social robots in the public arena, the definition of robots themselves, the images circulating in media and to which we are getting socialized, as well the social construction that underpins actual interactions. SRT does not distinguish between acceptability, acceptance and adoption as different stages, but focuses on the socially shared meanings that underlie and connect these different coexisting steps. In this perspective, both attitudes and practices become expressions of representations of the object, closely linked to the meanings the object has for different groups. In contrast to more cognitive approaches to shared beliefs, moreover, these representations cannot be limited to individual knowledge or pieces of information received from the outside, but must be seen as social processes of knowledge construction, in which different groups encounter - and often compete- in the social arena to define *what* a given object actually is.

Research conducted from the SRT perspective, for example, confronted expert and laypeople's definition of social robots (Sarrica, Brondi & Fortunati, 2019). Results show that scientific definitions are not purely descriptive nor exempt from rhetoric strategies. Visionary and forward-looking definitions are, in fact, strategically used to embed values and attitudes in the veritable definition of what social robots are, thus providing a positive connotation to robots as human partners. The same concepts resonate in popular definitions of social robots, which share common features for what concerns autonomy, bodily materiality and social interaction. The representation of robots as autonomous entities is especially relevant. It is present in expert and

lay knowledge, however in the latter it might pave the way to negative attitudes. On the one hand, social representations of robots as completely autonomous may lead to fear and avoidance of machines, which could be conceived as potentially dangerous. On the other hand, the same representations could lead to negative evaluations and difficulties in the adoption stage of actual robots, which prove far less autonomous than imagined.

Looking at social representations circulating among young adults, research shows the coexistence of competing representations among the new generations, which are expected to be particularly affected by the robotic revolution. Representations shared by young adults already mix materiality, evaluations of pros and cons, value-based interpretations. In particular, different representational facets can be traced back to three main antithetic visions of the Human-Robot relationship: robots are represented as separate or integrated into society; robot presence is expected in everyday activities or confined to imaginary sphere; they are represented as agent or as electro-mechanical devices to be activated when needed. All these visions compete and explain different degrees of acceptability not only in the dull and dirty domain, but also for educational, care and health purposes. Once again, above all, mind perception plays a pivotal role in the representation of sociability of robots and in their acceptability (Brondi, Pivetti, Di Battista & Sarrica, 2021; Piçarra, Giger, Pochwatko & Gonçalves, 2016).

Going further to the ontogenesis of these representations, research conducted with children and preadolescents aged 9 to 14 shows that the socialization is already completed by that age. Children discriminate the same facets of shared knowledge identified in young adults and in expert definitions. Moreover, they clearly distinguish between the cognitive, pragmatic and figurative elements of the representations, suggesting once again that the conflict between these representational aspects can be at the core of ambivalent attitudes circulating in the society and -in the end- of the difficulty encountered in moving from potential acceptability to acceptance and long-term adoption (Fortunati, Esposito, Sarrica, & Ferrin, 2015).

It is clear, from the studies we briefly summarized, that social representations of robots shared by expert, laypeople, young adults and children are part of broader cultural elaborations, which are transmitted and readapted from generation to generation and from technology to technology.

Representation, technology and the imagination
Since at least the first industrial revolution, technology became the subject of specific forms of discourse that framed technical achievements, from the railway to the computer, within a lively rhetorical tradition in the public sphere (Carey, 1989). Technology became the center of what Leo Marx (1964) and David Nye (1994) have called the technological sublime, whereby the romantic awe for natural landscapes and forces was broadened to the modern sense of admiration and wonder for technical achievements.

Scholars such as Carolyn Marvin (1988), Lisa Gitelman (1999) and Vincent Mosco (2004) have traced the trajectory of the technological sublime in different periods and areas, from the emergence of electronic media in the nineteenth century to the digital age, highlighting the trajectories of different bodies of imaginaries that coalesced around specific technologies (see Natale and Balbi, 2014). In this context, the representation of robots reveals elements of similarity as well as specificity with regard to other examples of technical imaginaries.

One of the characteristics of technological imaginaries is that they often proceed through a range of recurrent narrative tropes that emerge again and again in different periods, dominating representations of specific media and technologies (Natale, 2016). For instance, the idea according to which a new technology "kills" the older one has been a common trope in the popular imagination at different moments of time: at the end of the nineteenth century it was speculated that sound recording would substitute reading and the print book, later television was celebrated as the death of cinema and today new streaming services such as Netflix are heralded as the end of the television (Balbi, 2005). For what concerns robots, one can identify at least two recurring narratives that accompanied their public representations across several decades. The first narrative trope portrays robots as a threat for the existence of humans, imagining a future where a conflict occurs between humans and machines; the second trope frames the emergence of robots in a moral drama where these beings force humans to reconsider their identities and readjust their feelings and relationships with machines (Bory & Bory, 2016; Goode, 2018).

Another common characteristic in technological imaginaries is the selectivity of forms and types of representation: while certain elements are frequently represented, other elements are more easily silenced or overlooked in popular representations. For instance, novel technologies are usually overrepresented (Boddy, 2004), while less attention is paid to the maintenance and improvements of existing technologies, notwithstanding the fact that the latter play an important role, too (Edgerton, 2007). For what concerns robots, both fictional and non-fictional representations have predominantly focused on anthropomorphic robots, while industrial robots have been comparatively neglected, despite being an exceedingly relevant area of application (Guzman, 2016). Similarly, strong AI, a theoretical form of AI that would replicate human functions, often takes up significant attention, while existing technologies of weak AI are comparatively less discussed; this reflects a long-standing popular fascination with the idea of machines that replicate and equate humans (Botting, 2020).

Among aspects that distinguish popular representations of robots from technological imaginaries of other technologies is the particular relationship between fictional and non-fictional accounts. In many areas, the science fiction imagination markedly departs from non-fictional representations, such as reports on news media: fictional narratives of space travel, for instance, most often differ markedly from discussions of this topic in the public sphere (Sobchack, 1997). In contrast, scholars researching popular representations of robots have observed not only differences but also similarities between how robots are represented in science fiction and how they are discussed in popular, non-fictional platforms. Journalistic reports, for instance, frequently take up fictional examples such as popular films to introduce discussions of robots (Goode, 2018), and often discuss humanoid robots and strong AI despite the fact that these are not dominant or are even inexistent (for what concerns the case of strong AI) in existing technologies (Rhee, 2018). The popular culture of robots, in this sense, transcends the realm of fiction to encompass a wide range of commentaries and reports that, instead of shaping a distinct discourse about robots, remains in a relationship of broad continuity with fictional representations.

The power of representation
Although one might dismiss technological imaginaries about robots as "just" representation, research has highlighted how the discursive level informs material, economic and political choices related to technology.

Scholars such as James W. Carey (1989) and Carolyn Marvin (1988) have shown that technologies are not only material things, but also imagined constructs that inform our visions and understandings of the world. Considering the trajectories of technological imaginaries, however, cannot avoid a complicated question: what is the relationship between the material and the discursive dimensions of technology? Avoiding this question, in fact, would lead to what Karen Barad (2007) has criticized as a "representationalist perspective," whereas the chain of connections between the material and the discursive follows a purely metaphorical approach. In fact, if one wants to challenge the idea that words and ideas are strictly separated from the world of matter, Barad and others contend, it is necessary to look at the engagement between such dimensions in a way that is not limited to the metaphorical level.

Throughout the history of robotics and AI, popular representations in the public sphere helped shape how researchers and developers in this field conceived of their own goals and assumptions about AI (Natale and Ballatore, 2020). Recent research has shown how this applies also to the case of robotics and AI, as narratives are incorporated within policy documents that shape the governance of these technologies and the action of public institutions (Bareis & Katzenbach, 2022; Mager and Katzenbach, 2021; Carpenter, 2016). Large part of the public, moreover, still only come in contact with robots through mass media, which makes popular media a key variable for establishing attitudes and orientations towards robots (Stein and Banks, 2023).

For what concerns social robots, representations are activated not just at the level of popular culture and the public sphere, but also at the level of everyday interactions with these technologies. For instance, AI pioneers such as Marvin Minsky and Joseph Weizenbaum noted that users' reactions to simple machines exhibiting the appearance of intelligent behaviour could vary from attribution of intelligence to more sceptical views, and that this also depended on previous information and representations that the users had received about computers (see Natale, 2021: 33-49). As practical AI systems were implemented with mixed results, it became clear that the race for AI was not only run in the realm of technology but also in that of the public imagination (Crevier, 1993).

Ultimately, the fact that representations can have significant practical impact implies a particular responsibility to be assigned to the act of creating and disseminating narratives and representations about robots. In this regard, researchers have interrogated the impact that representations of robots can have in areas such as private and public investments. In particular, the question arises if representations of robots that focus on strong AI and on narrative tropes such as the conflict between humans and machines might mislead both the public and important stakeholders, such as policymakers. Some, nevertheless, give a substantially optimistic responses to this question, highlighting the fact that popular culture leads to productive discussions about AI and robots in the public sphere (Goode, 2018), or using popular representations as a way to envision potential futures for robotics in specific areas such as nursing and care (Erikson & Salzmann-Erikson, 2016). Yuji Sone (2016) has shown the deep connections between a culture of performances and representations around robots informed public acceptance of this technology in Japan, which also benefited industry efforts in the area, notwithstanding the fact that actual adoption is still relatively limited even in main application areas for social robotics, such as elder care (Wright, 2023).

As social robots become more widely produced and used, especially in areas such as entertainment, nursing and care, more robust discursive means will be required to ensure that the relationship between representations and technology bears productive rather than negative effects. Importantly, such discursive work should move from the acknowledgement that the discursive and the material or technical dimensions are not separated but closely allied. A similar observation is even more appropriate for social robots, given the degree to

which this technology has been the subject of intensive representations in both fictional and non-fictional contexts (Sobchack, 1997; Sone, 2016).

In this regard, for example, fashion provides a peculiar perspective on the play between representations, perceptions, materiality and practical interactions with these technologies (Danese, 2015).

Fashioning technology

Throughout the centuries, the design of technological devices has made them increasingly assimilable to accessories, and has contributed to making current technologies fashionable and an integral part of our life.

Garments have become objects of wonder— especially in fashion shows — and a source of curiosity by the public and investigation by the scholars. Some designers are particularly interested in using technologies to create clothes that move or light up by interacting with the environment, with the body movement. One of the best known is Hussein Chalayan, who over time has worked with a team of engineers to realize collections of clothes that move and light up in various ways. In many other examples there is no real use of technologies, but the style is inspired by them with the use of metallic and transparent materials, rigid exoskeletons and numerous references to science fiction, mechanics and androids. In all these examples, the technology is encased into the garments and the accessories.

Nowadays, the relationship with technology is not only represented by the material and experimental processes of the garments, but also by communication and promotional initiatives which involve technologies as a demonstration of fashion belonging to the contemporary world. This is the case of "Robotized. Experiments in Italian fashion"[1], an exhibition project – initially organized in Rome in 2021 and presented in Madrid in 2022 - which combined art, fashion and robots. The exhibition-performance presented the garments of some Italian and international designers who, together with the creations of young independent Italian authors, ideally dialogued with metal robots lent by an important Italian collector of "mecha." The robots used in this performance were a kind of huge self-propelled mechanical instruments, often in humanoid form. They were controlled by one or more pilots operating from within the exoskeletal structure, similarly to the ones imagined for the famous Transformers toys and movies.

In another fashion event — the Philipp Plein fashion show organized in New York in 2018 — a robot was holding the hand of a model who seemed to come out of a spaceship. Like most of the fashion shows, the event was organized as a form of communication and spectacle, aimed at promoting the new collection and the brand, as well as at amazing the press and the public in general. The presence of robots and a futuristic set projected the imagination towards the future and the wonder of technology.

With the same intent Kim Jones presented in Tokyo the 2019 Dior's pre-Fall men collection characterized by metallic and technologic-like outfits. The stage was dominated by a giant robot female statue designed by contemporary Japanese artist Hajime Sorayama. As the show began, lasers illuminated the huge sexy robot woman who featured in the middle of the spherical catwalk, shining down her silver body, like a contemporary version of the gynoid *Maschinenmensch* in the movie Metropolis. Despite putting robots on stage, however, these performances didn't display real AI machines. In other fashion shows, instead, the robots were the same used in factories and warehouses, and their presence was intended like that of actors, capable to move and interact with models. There are numerous variations on this theme: a very popular one, for instance, is the performance at Alexander McQueen's fashion show for the spring 1999 collection, in which two robotic arms sprayed with paint the voluminous white dress worn by model Shalom Harlow who, placed on a revolving base, rotated on herself. Consistent with the recurring sentiment in the work of the English designer, the model was represented as a victim attacked by robotic arms that decorate the dress by imposing their programmed and insensitive action.

Another robotic arm operated during the Rag's and Bones spring summer 2020 fashion show, but with a very different intent and effect. Using an industrial robotic arm connected to a kinetic sensor, the creator aimed to make the mechanism move in consonance with the movements of the dancers who performed during the show. Similarly, models paraded on a conveyor belt at Philipp Plein's 2016 ready-to-wear fashion show, interacting with the mechanical arms that handed them their handbags. Also, in this more articulated show a robot played the drums while a repetitive background music with a metallic voice sang "We are the robots". More recently, in 2021, Dolce and Gabbana paraded robots together with the models. On the catwalk three iCubs, humanoid robots built by the IIT (the Italian Institute of Technology based in Genoa), walked the runway alongside the models.

In their diversity, all these examples demonstrate the desire to attribute to robots the qualities of a living being, sometimes a moral agent, which *does* things upon or with humans.

Fashioning Robots

Different is the case of robots that are on the stage by themselves. This is the case of Sophia, the gynoid already quoted at the beginning of this chapter, which is one of the most known robots, promoted in various

websites and magazines. In this particular area of fashion the figure of the female robot is juxtaposed with that of the model and that of the mannequin, whose warmth and humanity are perceived as deceptive or illusory.

The chief marketing officer of Hanson Robotics and informal stylist of Sophia, Jeanne Lim, declared that they don't have a style philosophy for her. This is one of the reasons why the company made an agreement with Ph5, a Chinese brand of knitwear, in order to improve her style. One of the fashion designers explained that Hanson "wants her to be humanlike, but in past interviews, she's always been very business formal, in a white shirt or a black blazer" and "Being fashionable and wearing interesting young designers instead of well-known brands makes her seem even more human." In the Instagram profile *Realsophiarobot* a short video shows Sophia walking while wearing a dress of Ph5 customized for her. Alongside, the text appears to bear a statement by Sophia: "A lot of people have asked what I was wearing for my first steps (here they are again!). I was honored to be wearing @ph5official - a brand 100% designed and manufactured by women. They're all about diversity, innovation, risk-taking, and playfulness. Just like me!".

Although the communication regarding this kind of robots aims at connecting them to the fashion world, they are still prototypes (Borau et al., 2021) that are never really used on the catwalk. In fact, the research of engineers that is focused on improving the performances of robots concerns also their movement and body proportions: the model used to design a humanoid robot is based on the golden ratio rule adopted to evaluate fashion models. They hope that the robot design, based on this rule could be like a fashion model girl that always owns elegant postures (Fortunati, Sorrentino, Fiorini & Cavallo, 2021; Tu & Tsai, 2011).

On the other hand, in an article entitled "Why Androids Like Sophia Dress Conservatively", the author points out that "robots are often gendered female, and face a lot of the same sartorial assumptions that human women do", and the purpose of humanize these computers encasing them in silicone skin "does not simply add a veneer of reality; it reveals inherent biases ingrained in our human culture: gender norms, beauty standards, and style expectations" (Love, 2017). It is interesting to draw the attention to the world "diversity" in the statement of Sophia: it suggests that robots could be perceived as a particular form of humans. But robots are a standardized presence in the field of fashion while, on the contrary, more often the human models working on shows or pictures differ by age, size, gender and nationality (Joblin, Nesbitt & Wong, 2022).

A diverse approach could be found in the project made by the artist Simon Georgiev for Highsnobsociety, a global fashion and media brand focused on trends and news in fashion, art, music and culture. They produced a series of robots, from one with the features of the fashion designer Rick Owens to a group of robots conceived with the style that characterizes the Givenchy fashion of the art director Riccardo Tisci. The outputs aren't some garments, but a bunch of robots with a specific designed style. The technologic body isn't hidden under an outfit but the robot itself is thought like a fashioned body. It is noteworthy that the information regarding these "luxurious robots" specifies that they are constructed in the same measurements as masculine models. All these approaches raise the question about the need to attribute a specific gender also to the robots. Anyway, this last experiment seems to be an interesting answer to the match of robotics with fashion.

Mannequins vs Robots

While on the one hand AI researchers try to emulate human movements, expressions and behaviors, on the other hand, on several occasions, models are required to mimic a pose or, in the case of the catwalks, an expression and a "robotic" walk. Impassive, inexpressive faces, rigid positions and movements, expressing passivity and absence of willpower, are clearly perceptible in the pose of fashion photo shoots or in the movements of the models walking in the runaway. It seems a kind of statement of what they are used for: to expose fashion. The characteristic of these performances confirms the idea concerning the commodity reification of mannequins analyzed in depth by Caroline Evans (2011; 2013). In addition, the contemporary tendency to ask the models for a different expressiveness, to not create an emotional contact with the public, manifests a visual reference to the mechanical nature of robots. Charlotte Gainsbourg's postures in the photo shoot by David Simms for the Balenciaga fall/winter 2008/09 collection are significant examples of this trend that subverts the traditional ideal of a lively and seductive model. The stiffness of the pose also brings us back to the association of the mannequin's body with that of the dummies, a disturbing superimposition of the human and its inanimate double (Fortunati, 2010). The history of the fashion model is one where the first "living mannequins" were known as sosies (or doubles) and later likened by contemporaries to robots, androids, and lifeless ideals (De Perthuis, 2018). In this association, reversing the perspective, the android on the runway aspires to create the illusion that the dummy can finally walk, act and speak.

Conclusions

By focusing on the relationship between popular culture and robots, this chapter shows that the two sides of this relationship are not distinct but intimately allied. It is impossible to understand the social, cultural and technical dynamics of real-world robots without taking into account how these are imagined and represented in the public sphere. First, perceptions inform practical uses and interactions of robots, and are constantly taken

into account by developers and companies to decide key aspects of the technology's design and functioning. Second, robots are both imaginary and actual technological objects at the same time, as the public representation of this technology not only reflects but also informs the goals and directions of research as well as the strategies of private and public stakeholders.

The case of fashion, in this regard, proves particularly revealing: as our discussion has shown, robots have not simply been used to represent garments, but have been involved in a veritable feedback loop whereas the representation of robots entered in multiple dimensions of a crucial dimension of fashion, such as communication and spectacle, while fashion has come to orient the likeness and performances of robots. As robots will enter more and more into the practical lives and experiences of users around the world, the lens of popular culture will prove in this regard strategic to navigate the complex balance between technical issues on the one side and social and cultural issues on the other sides. Rather than refusing the popular culture of robots as misleading or unimportant, considering public representations of robots as a crucial, structural dimension of the technology can therefore provide stronger means to create robots and prepare them for public engagement and use.

Notes

1. "Robotizzati. Esperimenti di Moda Italiana", exhibition-performance conceived and curated by Stefano Dominella with the artistic direction of Guillermo Mariotto, organised in Rome by numerous local institutions until 24 January 2021 and re-proposed from 8 July to 28 August 2022 at the Serrería Belga in Madrid by the Embassy of Italy in Spain, by the Italian Cultural Institute of Madrid and by the Festival of the Municipality of Madrid, Veranos de la Villa 2022.

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