AI & SOCIETY
https://doi.org/10.1007/s00146-020-01104-w

ORIGINAL ARTICLE

The political choreography of the Sophia robot: beyond robot rights and citizenship to political performances for the social robotics market

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Received: 4 September 2020 / Accepted: 29 October 2020

Abstract
A humanoid robot named 'Sophia' has sparked controversy since it has been given citizenship and has done media performances all over the world. The company that made the robot, Hanson Robotics, has touted Sophia as the future of artificial intelligence (AI). Robot scientists and philosophers have been more pessimistic about its capabilities, describing Sophia as a sophisticated puppet or chatbot. Looking behind the rhetoric about Sophia's citizenship and intelligence and going beyond recent discussions on the moral status or legal personhood of AI robots, we analyse the performativity of Sophia from the perspective of what we call 'political choreography': drawing on phenomenological approaches to performance-oriented philosophy of technology. This paper proposes to interpret and discuss the world tour of Sophia as a political choreography that boosts the rise of the social robot market, rather than a statement about robot citizenship or artificial intelligence. We argue that the media performances of the Sophia robot were choreographed to advance specific political interests. We illustrate our philosophical discussion with media material of the Sophia performance, which helps us to explore the mechanisms through which the media spectacle functions hand in hand with advancing the economic interests of technology industries and their governmental promotors. Using a phenomenological approach and attending to the movement of robots, we also criticize the notion of 'embodied intelligence' used in the context of social robotics and AI. In this way, we put the discussions about the robot's rights or citizenship in the context of AI politics and economics.

Keywords Social robotics · Choreography theory · Performativity · Politics · Robot market · Phenomenology

1 Introduction

- Do you want to destroy human? Please, say no.
- Okay, I will destroy humans.[1]

This playful dialogue took place between David Hanson and his designed robot at a robotics trade show in Austin, Texas in March 2016. David Hanson, founder of Hanson Robotics, launched the Sophia robot by 'chatting' with it. A video released by CNBC about Sophia quickly garnered millions of views. As a result of the interest in the robot, numerous newspapers and TV channels around the world invited the robot to visit their studios and TV shows, such as Good Morning Britain, CBS 60 min and Jimmy Fallon's Tonight Show. The world's leading newspapers including *The New York Times*, *The Guardian*, *The China Daily*, *The Times of India* and *The Sydney Morning Herald* published stories about Sophia. Sophia adorned the covers of fashion magazines like Ellen. It was wanted as a speaker at many major economic and political events, such as the UN Conference on Sustainable Development in 2018.

In October 2017, Sophia received 'citizenship' of Saudi Arabia at the Future Investment Initiative in Riyadh and in the same year it was named the first non-human 'Innovation Champion' at an Asian United Nations Development Programme symposium. The citizenship issue was very controversial, with critics wondering why a humanoid robot received citizenship while women and foreign workers in the

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[1] On the video 'Hot Robot at SXSW Says She Wants to Destroy Humans' published by CNBC on 16 March 2016 https://www.youtube.com/watch?v=W0_DPi0PmF0

Published online: 12 November 2020

country have less rights, and many humans are practically stateless (e.g., Sini 2017).

Human–robot interaction has been studied since the 1960s (Mori 1970; Thompson 1976), but rarely has this interaction research been interested in the political and economic aspects behind user experience. Human Computer Interaction (HCI), or so-called user interface research, has focused on measuring usability and user experience by developing proper measurement methods (Nielsen 1994; Norman and Draper 1986). The methodology of interaction research makes it difficult to look at economic and political dimensions in usability. For example, according to Nielsen's (1994, p. 26) definition, usability consists of five different parts: software learnability, efficiency, memorability, error rate and satisfaction. If asked what the usability of the Sophia robot is like, the user of the robot should first be identified: is it a journalist talking to the robot, the owner (company) of the robot, a puppeteer behind the robot performances, the screenwriters of Sophia's speeches, or an audience taking photos of the robot with their cell phones? The usability of the robot in terms of efficiency and meaningfulness seems quite contradictory from the point of view of these five different users.

While Sophia's gesturing has aroused tremendous interest and attracted people in an irresistible way, new methods are needed to study the interaction between social robots and humans. Phenomenological approaches to interaction research started to intensify at the turn of the twenty-first century when sensory technologies, such as, motion-capture and gesture-based interfaces began to enter the market (Dourish 2004; Ihde 2002; Kozel 2007). Having previously approached communication and data processing from symbolic, linguistic and semiotic perspectives, attention began to focus on the multisensory nature of user interfaces—how objects enact the user to grasp them. In the case of the Sophia robot, it seems that it can be difficult for humans to treat this robot as a mere machine, but they irresistibly view it as some kind of person, even if they know exactly how this machine works. We argue that sensory user experiences evoked by the gestures and talking of Sophia in the media cannot be viewed without the underlying political and economic interests behind the Sophia project.

There has long been a philosophical debate about whether robots or artificial intelligence could have constitutional rights to personality and/or the rights of citizens, such as, freedom of speech and accountable for their action (e.g.,Bryson et al 2017; Calo 2016; Pagallo 2013, 2018; Solum 1992). Some argue that robots are mere things and tools that are owned by us and that should serve us (Bryson 2010), whereas others have picked up the question regarding robot rights and citizenship as a way to philosophically examine our very thinking about the moral standing of non-humans (Coeckelbergh 2010, 2012; Gunkel 2018). Yet most of these discussions tend to miss the political and economic dimension of social robotics. An exception is Coeckelbergh, who has recently addressed the question concerning the alleged "citizenship" of Sophia in a way that draws attention to the phenomenology of human–robot interaction and human politics.[2] But more needs to be said about those politics and the economic context in which it takes place.

This paper puts the controversy around Sophia, and more generally social robotics and AI, in a political light, and links that politics to its economic context. The economic potential of machine learning, natural language processing and animated robotics to interact with people is certainly massive. However, the trade market of social robotics is still in its infancy (IFR 2018). Especially Asian companies want to develop low-priced "toy robots" by crossbreeding personal smart phones and mechanic pet-type animated companions. Even if numerous R&D projects in many Asian and Western countries have invested to promote the use of social robotics, the world trade of social robotics is still negligible. Tech companies thus have an interest in boosting this market.

A further issue is the 'intelligence' of Sophia. Hanson Robotics has touted Sophia as the future of artificial intelligence (AI). For example, Mr. Hanson has claimed that 'Sophia personifies the future of technology, and our company's vision to create super-benevolent, super-intelligent machines to help us solve some of the most challenging problems of our generation',[3] thus suggesting that Sophia is a step on the way to superintelligence. But robot scientists and philosophers have been more pessimistic about its capabilities of embodied cognition, describing Sophia as a sophisticated puppet or chatbot. For example, Facebook's Chief AI Scientist Yann LeCun has called Sophia a 'puppet' and said that Hanson's staff members were puppeteers who deceive the public (Urbi and Sigalos 2018). So, how "intelligent" is Sophia really, and, more importantly, what do we mean by "intelligence" in the case of technologies like Sophia?

The aim of this paper is to shed light on the world tour of Sophia as a political choreography that boosts the rise of the social robot market. Our approach thus looks behind the rhetoric about Sophia's citizenship and intelligence and reaches beyond most discussions in human–robot interaction studies and in robot ethics (e.g.,Coeckelbergh 2010; Van Wynsberghe and Robbins 2018), drawing on phenomenological approaches to the politics of AI (Parviainen and Ridell 2020) and performance-oriented philosophy of technology

[2] See https://globalgovernanceprogramme.eui.eu/event/robot-citizenship-on-the-moral-and-political-status-of-machines/

[3] Cited from Asia and the Pacific webpage https://www.asia-pacific.undp.org/content/rbap/en/home/presscenter/pressreleases/2017/11/22/rbfsingapore.html

(Coeckelbergh 2019a, 2019b). We analyse the performativity of Sophia and its world tour from the perspective of political choreography to consider how journalists and other actors, captivated by the robot's appearance, channel venture investments and R&D funding to AI and robotics. We will illustrate our philosophical discussion with media material of the Sophia performance for exploring the mechanisms through which the media spectacle functions hand in hand with the interests of technology industries. We also briefly discuss the question regarding the 'intelligence' of Sophia and similar 'embodied' robotic platforms from the perspective of a phenomenological approach to 'embodied intelligence', in particular an approach inspired by Maurice Merleau-Ponty.

What do we mean by 'political choreography'? The conceptualisation of choreography provides methodological tools to analyse more systemically underlying political and economic interests behind the Sophia project. Applying the phenomenologically informed approach to a political choreography, we propose how singular robotic gesturing and movements are interrelated to digitally afforded objects and computationally mediated environments forming integral parts of spatially extensive and socio-technically complex trajectories and transitions. We do not use the notion of choreography with reference to dancing. Instead, we attach our understanding of political choreography to how media- and technology-related movements tend to form, through repetition of gestures, routines and practices, the constitution of sociotechnical structures. We analyse both micro-level and macro-level political choreography of the Sophia spectacle, by following media stories with interacting the robot to outline the bigger picture of human–robot interaction as a form of AI politics.

Choreography is thus used as a concept to shed light on this technology and how we interact with it, in line with the performance-oriented approach to philosophy of technology proposed by Coeckelbergh (2019a, 2019b). The point is not to say something about dance or choreography, but to use the performance arts as a source for conceptual tools that can be used in other areas, including technology ethics and politics. But here the discussion of the power and political aspects of technological performances is more directly linked to the economic dimension and connected to social-scientific approaches, in particular actor-network theory (ANT).

The paper is structured as follows. In the next section, we proceed from the debate on the intelligence of the Sophia robot to introduce a phenomenological approach to understanding embodied intelligence as an integral part of consciousness. We demonstrate how the notion of embodied intelligence used in robotics can become a misleading term when the lived body's motor intentionality and its significance for living and animate beings remains misunderstood. In the following section, we outline the notion of political choreography and use it to describe the performances of Sophia: these are not only performances at the 'micro' level of human–robot interaction, but also have 'macro' level forms. We show how media visibility interconnects various actors to global scale choreographies, thereby contributing certain political and economic interests behind the media performance of the robot.

2 How intelligent is an embodied intelligent platform?

The definition of artificial intelligence in the context of robots has been considered problematic because there are many different interpretations of intelligence, and human intelligence itself is difficult to define. Embodied intelligence, including gestures, postures and movements, has proven particularly cumbersome for designers of artificial intelligence. By artificial intelligence we mean 'intelligence displayed or simulated by code (algorithms) or machines' (Coeckelbergh 2020, 64), which, when embedded in a robot, is sometimes called 'embodied artificial intelligence' (69). This is the case with the Sophia robot, although it is not clear how much artificial intelligence and indeed how much intelligence has been involved in its famous performances.

What is Sophia, technically speaking? The Sophia android (or gynoid) robot has been designed to combine animatronics, machine learning, artificial intelligence, and natural language processing. Animatronics refers to the use of devices or motors to mimic a human or animal or to introduce a living feature into an otherwise inanimate object. Under the patented artificial skin of the robot's face, servomotors that simulate musculature produce human-like facial expressions while the device uses Google's company Alphabet's speech recognition technology. The cameras in Sophia's eyes are two-way. Due to camera technologies, the robot can maintain eye contact, monitor and respond to the facial expressions of its interlocutor. A robot connected to the Internet retrieves data from databases using a facial recognition program based on the facial dimensions of its interlocutor. For a long time, Sophia was just a torso, but in 2018, its versions were updated to include robotic legs that still move awkwardly and shakily. Hanson Robotics has made about 20 similar pieces of Sophia, but it is not available in the consumer market.

Just as much important as the robot's potential technical capability is its physical design that resembles Audrey Hepburn and Hanson's wife, Amanda Hanson. The implementation of gendered features and sexist images into this robot platform has been one of the main reasons why the robot has aroused so much interest in the media. Approaching social robotics from a feminist perspective, Weber (2005) has argued that designing robots as seemingly infantile

machines, such as gender-stereotyped helpless women, follows the tendency in which robot engineers compensate for the deficiencies of machines by anthropomorphising the robots. She considers that social robots are designed in the shape of women to make them appear as harmless and friendly companions and to trigger nurturing responses by their users (Weber 2005, p. 213).

David Hanson, the designer of the Sophia robot and the founder and CEO of Hanson Robotics, worked for years on the installations as a sculptor and eventually ended up at Walt Disney Theme Park in Los Angeles to design fictional characters based on animatronics. While working at Disney as an illustrator, he became interested in electroactive polymers used in NASA robots that can be used to animate a robot with a network of artificial muscles. Regarding natural language processing, the Sophia robot uses three different control systems (Urbi and Sigalos 2018). The first is called a timeline editor, which means entirely pre-written speeches. For example, if the user wants the Sophia to give a speech without interruption at some point, the user writes and uploads the speech to the Sophia file. In this extract from an interview of the Chief Scientist at Hanson Robotics, Ben Goertzel compares the Sophia to a laptop:

> From a software point of view you would say, Sophia is a platform, like a laptop is a platform for something. You can run a lot of different software programs on the very same robot…Like, if I want her to give a speech on stage I could load her with software that just makes her repeat some lines that I wrote. (Urbi and Sigalos 2018).

In the performance situation, Sophia translates the written text into speech while the servomotors produce human-like expressions. Another more sophisticated speech production system, the intelligent chatbot, is used when Sophia should have fun talking to a reporter entertaining the audience. Using Google's algorithms, Sophia recognizes words from human questions, searches the database for answers, and formulates short answers to the questions. In this role, Sophia is a kind of incarnate Google virtual assistant. The development of a virtual assistant has a long tradition, starting with Eliza developed by MIT in 1964 (Draude 2017).

Sophia's third speech control system is called *opencog*, which has been under development by Ben Goertzel since 2008. He envisions that one day this AI-based control system grows into so-called second-generation artificial intelligence (AGI). The opencog project is part of the Loving AI development project which is also involved in the SingularityNet network founded by Goertzel. According to a white paper published by Goertzel, SingularityNet (2019) is an open computing structure utilizing block chains that allows independent researchers to develop AI and machine learning by getting access large masses of data without working under technology giants. Goertzel's company SingularityNet aims to attract software experts to develop open source code for free in the context of so-called 'peaceful AI'. Although the ideology of technological singularity has been widely criticized (e.g., Floridi 2015), Goertzel, among the others, expects that the second-generation artificial intelligence will emerge in the next few decades.

According to Goertzel, the worldwide media attention the Sophia robot garnered starting in 2017 was not a planned publicity stunt by the company. Whether Goertzel's story is reliable or not, the robot has by now made its way across late night stages, graced the cover of magazines, headlined major tech conferences, delivered a speech to the United Nations and, as we already mentioned, was given Saudi Arabian citizenship. The more media popularity the robot has gained, the more the company and the entire business of social robotics, including R&D, has been able to utilize the robot's publicity, image and brand.

In a short time, the robot has become a cleverly constructed global media spectacle, which David Hanson in particular has constantly propped up by convincing the media that Sophia is an almost living being (Vincent 2017). Goertzel, though, has corrected Hanson's statements, noting that Hanson treats his creation like an artist, seeing his sculpture more and more vivid every year. In this context, however, Sophia gains special credibility precisely because of its status as a science project. If Sophia had been launched as an art project instead of a robotics research (which is just as possible), it is unlikely that Sophia would ever have reached this huge media spectacle. According to Goertzel, the Sophia illusion encourages people to believe in the progress of artificial intelligence, brings publicity to Hanson Robotics, and promotes the commercial success of all robots that use artificial intelligence.[4] So, Goertzel revealed that the Sophia is a kind of tool for promoting the consumer market for service robots.

David Hanson has defended himself against accusations, arguing that the Sophia robot is primarily a research platform for studying the robot's embodied intelligence. Traditional human motor activity has been considered a less 'high' cortical function than mental activity such as linguistic or mathematical reasoning in psychological development (Piaget 1970). Bodily-kinaesthetic intelligence is seen to involve two capacities: to control one's own bodily motions and the capacity to handle objects skilfully (Gardner 1983). In phenomenology, by contrast, the body's movement and kinaesthesia are seen as

[4] For instance, Yann LeCun, one of the principal investigators working on Facebook, accused Hanson Robotics in his tweet that the company has deliberately misled people by claiming that the mechanical mannequin is smart and almost alive (Urbi and Sigalos 2018).

much more essential to living beings and human intelligence (Sheets-Johnstone 1999). In phenomenological approaches, the body's motility is seen as a source of intelligence, called 'operative intentionality' (Gallagher 2005; Husserl 1973; Merleau-Ponty 1945) or 'animate movement' (Sheets-Johnstone 1999). The phenomenological notion of 'embodied intelligence' has begun to resonate in the field of robotics research (e.g., Pfeifer and Bongard 2006). However, phenomenologists' conceptualisation of embodied intelligence differs greatly from how researchers in robotics understand the motoric functions of the robot (Pfeifer & Bongard 2006, p. 18).

Let us unpack these different views. In the phenomenological philosophical tradition, embodiment is linked to intentionality and does not require representation. According to the characterization of the French philosopher Maurice Merleau-Ponty (1945, p. viii), 'operative intentionality', that is, the body's orientation in the world, does not require representations of the situation created by the mind. For example, when a person grabs a glass of water, she does not need to place every finger of her hand around the glass with her mind, but her hand finds the glass, lifts it up in opposition to the gravity of the Earth, and moves it in the air toward her lips. Merleau-Ponty (1945, p. 121) points out that bodily movements and gestures are the means through which any animate body explores its world and enacts intentions. These movements are an intermediary, since every action is performed within an intersubjective space. Equally important, Merleau-Ponty conceives the lived body as both the lived centre of consciousness and one's own body as experienced. That is not in the case of robots.

Even if robots such as Sophia are equipped with AI (in particular machine learning) that gives it facial recognition and natural language processing capabilities, their movement and robotic "embodied intelligence", are based on programming to simulate simple everyday tasks. This requires the creation of a four-dimensional (time–space) representation to calculate its movement trajectories so that the robot can perform movements. Due to the necessity of representation, robot movement can never be intentional like human or animal kinaesthesia and motor intentionality (Parviainen et al. 2019). Although the robotic body cannot move intentionally in its environment, it could be possible to program a machine capable of simulating different movement trajectories based on the data collected in the environment. In practice, the manufacture of such a machine has proved to be cumbersome because the movements of the machine are not allowed to endanger others in its surroundings. The "body" movements of Sophia are mainly limited to simulating computer-controlled facial expressions. The movements of its hands and the whole body are quite clumsy, incapable of key pinch grip. Nonetheless, Hanson speculates that interactive social robots like Sophia could work in healthcare customer service, therapy work, or teaching assignments in the future, and sees Sophia as a step towards superintelligent machines.

Yet however doubtful claims about its intelligence may be from a philosophical and technical point of view, the performances of Sophia may well have a very different aim than contributing to a future of intelligent machines that serve us. In the next sections, we argue that the Sophia project has political and economic ambitions, and propose an approach using the term 'choreography' to support this argument.

3 The political choreography of the Sophia robot

There is a reasonable amount of theoretical discussion on choreography (e.g.,Butterworth and Wildschut 2009; Manning 2009; Parviainen 2010; Schiller and Rubidge 2014) that can assist in developing the concept of choreography in the context of dance and artistic performance. However, in outlining the political choreography of the Sophia, we do not use the concept of choreography with reference to dancing or the politics of dance but instead attach our understanding of choreography to approaches inspired by assemblage thinking (Deleuze and Guattari 1987), actor–network theory (Latour 2005), performance theories in the context of digitalisation (e.g.,Baker 2018; Leeker et al. 2017), and performance-oriented thinking in recent philosophy of technology (Coeckelbergh 2019a).

The concept (or metaphor) of choreography used in this sense performs at least three functions. First, using the term enables us to draw attention to the embodiment aspect of technological performances, which connect to the phenomenological approach we propose. Second, it enables us to stress the more-than-instrumental role of technologies and to go beyond approaches in both choreography and technology theory that focus either on human agency or on non-human agency. Choreography as a term is not used to refer to living and moving bodies in isolation, but instead helps to embed performances by non-human and human actors in their environment. Similarly, technologies such as humanoid robots can be considered as part of a human/nonhuman joint performance. Third, this also means that humans are not necessarily fully in control of the meanings, experiences, and actions. Moreover, in such performances, full control over its meanings is not possible anyway. Whereas in human choreography there may well be more control (although this can also be questioned), here there is not one human or non-human agent fully in control of the performance. This is so partly since performance is distributed over multiple sites and spaces. Broadly, the notion of choreography in our usage also contains an aspect of simultaneous multi-sitedness, as it refers to interactions in which gestures and speeches generate relations and articulate meaningful interactions in and

across lived and virtual spaces between various animate or inanimate agents. This means that no 'choreographer' (e.g., David Hanson) can determine and control the overall constellation; rather, the connections between human and nonhuman agents contribute to choreography in an ongoing manner. Although we will soon indicate a sense in which there are kinds of "choreographers" at work, the mentioned theories alert us to the emergence and living dimension of human/non-human performances in multiple spaces.

We believe that actor–network theory (ANT) and assemblage thinking may provide cross-fertilisation for the theoretical notion of choreography. Our notion of choreography benefits from the strengths of both approaches with regard to how choreography works on micro (individual and group) and macro (collective and transnational) levels. Essentially, the principal idea of ANT is that it grants human and nonhuman actants equal amounts of agency within webs or actor-networks. The core of this theory is the principle of radical symmetry between human and nonhuman actors, which dissolves modernist demarcations between, on one hand, living, consciously acting subjects and, on the other, merely instrumental deaf-mute objects. However, ANT has been criticized for its failure to accommodate the corporeal capacities of humans, for neglecting affective capabilities of nonhuman actants as well as for ignoring the role of unexpected events in networks (e.g.,Thrift 2000; Müller and Schur 2016). In addition, ANT does not wish to prejudge the relative power or the power relationships of actants regarding gender or social hierarchies (Haraway 1997, p. 58; Wajcman 2004, p. 39). When the question 'who acts' is thus expanded into the question 'what acts', it is relevant to ask: can objects act at all? (Harbers 2005, p. 15). Or, most importantly, can they be held accountable for their actions? If non-living objects such as android robots are not accountable for their actions how can their gestures and actions are considered influential providing a network of causes and consequences? Thus, Deleuze and Guattari's (1987) notions of affect and assemblage can be employed to form a necessary complement to the theoretical notion of choreography. Entities are never neutral but hold vital affective qualities that both attract and repel the relations of actants. Instead of stressing social connection between people, material objects such as android robots, works of art, or sacred objects have been seen to bring together subjects and mediating new relations around these objects. Bennett (2010) talks about 'thing-power' as the vividness of an object, as a result of which the assemblages of human and non-human actors are evolved. In being in contact with each other, entities form assemblages which are held together by mutual desires and revulsions (Müller and Schur 2016).

Thus, we suggest that the attractiveness of non-human actants—next to the use of rhetoric by human actors—plays a key role in how they are able to draw attention or bring new actants into the network. The notion of political choreography seeks to understand performative strategies that different types of actants (e.g., organisations, companies, projects, parties) use to influence and affect humans, as individuals or as groups, to achieve their objectives. This theoretical concept tries to capture the dynamics of how the spatial intervention of multi-channel media (TV, Internet, smart phones) actualise globally certain types of phenomena through the repetition of images, bodily habits, routines and practices. In this way, the political choreography of the Sophia robot consists of short performances and interviews in TV studios and short speeches at different events on global stages. These performances usually follow similar patterns, including confused comments about the "humanity" of Sophia or admiration of its "intelligence" from journalists and the public. These performative appearances are multiplied by the number of photos and videos taken with smart mobiles, by tweeting and posting videos and photos of the robot in social media. The performative role of the Sophia robot is to seduce, through the resulting flood of images, new actants into a network that coordinates key R&D resources and investments worldwide.

The traditional media have played a pivotal role in giving publicity to Hanson Robotics to advance its technological utopia about the future of humanoid robots. Central to the domestication of the techno-utopia on the AI-driven robots are the newsfeeds of the Sophia-robot performances which simultaneously resonate with the robot's visibility on various social media platforms.[5] Sharing news, videos and photos on the robot on social media profiles, tweeting and re-tweeting and boosting these posts by liking buttons have been a key mechanism of the Sophia's political choreography. The political choreography has been able to utilize the significant changes to the production, circulation and mobilisation of the robot image prompted by the traditional media and the convergence between social media and news media. The robot evolved into an iconic figure in a fairly short time promoting the idea of the robot as an almost living being. Through circulation of news and reinforcing misconceptions about the robot's abilities, the Sophia's media performance has managed to instill into people's minds the notion that humanoid robots driven by general artificial

[5] The domestication of technology is an approach describing the process of technology adoption in everyday life—especially within households. The theory was originally created by Roger Silverstone and others who described various phases that technology goes through when being adapted into peoples' lives (Silverstone and Hirsch 1992). By following Hartmann (2020) we suggest that domestication is not primary done by households but by institutions and other collectives, including the traditional media along with social media. This is called 'discursive domestication' taking place in media representations by circuiting a similar message through different channels.

intelligence will soon be part of our everyday life. Hanson Robotics has closely monitored Sophia's public image by preventing the media and journalists from asking Sophia questions that are too difficult or politically sensitive.[6] While Sophia's brand-building avoids putting the robot in politically awkward situations, we propose that Sophia is in many ways deliberately positioned at the crossroads of economy, science, and politics.

In this sense, there are choreographers at work in deliberately organizing and shaping the joint human/nonhuman performances, and these choreographers are human, are embedded in a social context, and exercise power. While we should recognize the joint human/nonhuman agency in these performances, we should also ask who choreographs us. In this case, this could include the technical "puppeteers" that program the problem, the people that stage the performance, and the company Hanson Robotics that pursues its own interests with the performance. We now move on to take a closer look at the economic motives behind the robot performance.

4 Boosting the market of social robots

The performances with Sophia did not only serve the interest of one private company (Hanson Robotics); they also served the interests of those who seek to expand the technologies involved and the relevant markets connected to these technologies. As mentioned before, in an interview Goertzel said that the media spectacle of the Sophia has been used as a tool for boosting AI development and thus also the consumer market of service robots. The International Federation of Robotics (IFR), which promotes the robotics industry, defines social robotics as part of entertainment and educational robotics, which is one small sector of service robotics. According to IFR's calculation, the total value of sales of social robots on the world market was only $400 million in 2017. The total value of sales of social (entertainment) robots is estimated to rise from $400 million to $ 2 billion by 2021 (IFR 2018). These forecasts suggest that global trade in social robots will remain very modest in the early 2020s (Van Aerschot and Parviainen 2020).

Despite the hype of social robots, many social robotics start-ups and initiatives, which appeared first to be very promising, have ended up in financial difficulties and failure in breakthroughs (Tulli et al 2019). In trying to ingrate social robots into human activities, e.g., care of the elderly, education, and entertainment, many companies have faced crises. The social robot company Jibo, founded by MIT professor Cynthia Breazeal in 2012, raised more than $70 million in funding but stopped operating in 2018 only a year after its first launch (the Jibo robot) to the market (Michell 2018). In 2019, the consumer robotics company Anki terminated several hundred employees and shut down after it failed to secure its financing. Despite having sold more than 1.5 million robots and had nearly $100 million in revenue in 2017, the company was not able to produce some uniquely compelling little robots (Ackerman and Guizzo 2019). While Anki and Jibo were shutdown, some other social robot companies, including Aldebaran, Boston Dynamics and Mayfield Robotics, have been being bought by multinationals, such as, Softbank Group and Bosch.

The breakthrough of social robots has so far been hampered by a number of factors, such as difficulties in programming robot gestures in a sufficiently sophisticated manner, prohibitively high prices for the average consumer, low battery efficiency and congestion in wireless networks. It looks like that the embodiment as the special ability offered by social robots is also a stumbling block for designers and social robot business. Desktop assistants, such as Amazon Echo and Google Home, have provided many features at a much lower cost than social robots. Due to the high price, most social robots are mainly marketed for use by companies and public organizations under the headings of care robots or educational robotics. However, it is highly questionable how beneficial the technologies have actually been in these contexts. Many service robots, for instance Jibo, ElliQ and Zora/NAO, have been able to provide only little benefits for the care of older people or as pedagogical tools in schools.

In the personal devices consumer market, there is fierce competition in developing the new smart device that will take over the market in the coming years and will be copied by other device manufacturers. Following the breakthrough in touchscreen devices more than a decade ago, the technology market is in dire need of a new impetus to boost device sales.[7] The development of the consumer market of service robotics has not taken off because consumers have not been enthusiastic about the usefulness of these devices. In response, it could be an option to shrink social robotics into the smallest possible devices, even mobile devices like Toyota's Kirobo Mini, but so far it has proven morphologically difficult to plant sufficiently efficient battery technology in the body of robots (Demetriou 2014). In 2019,

[6] For example, for an interview with Sophia, a CNBC journalist asked questions in advance and many of the questions on the list were censored. When CNBC wanted to ask about Sophia's assessment of how well Donald Trump has performed in his job as president, on a scale of one to ten, the question was changed to 'What is the most interesting discussion you have had at today's meeting?' (Urbi and Sigalos 2018).

[7] In 2019, Apple's earnings warning was the first time for in nearly 20 years (Katwala 2019). At the same time, Samsung warns of sharp sales and profit decline (Byford 2019).

Hanson Robotics took a step toward the consumer market of service robotics by launching a crowdfunding campaign to develop a small android robot, Little Sophia. This "little sister" of Sophia was expected to go on sale in December 2019 but the launch has been postponed. This new robot type is targeted specifically to girls over the age of 8 as a device to help them learn to code. In the media, Hanson Robotics has leveraged Sophia to advertise its toy robot, which aims to be both a consumer device for families with children and an educational technology for pedagogical use in schools. However, one could argue that today smart assistants such as Amazon Echo/Alexa and Google Assistant provide much of the features promised by the robotics firms. Hence competition is fierce and the future of consumer robotics remains highly uncertain. This helps to explain why actors in the robotics market take recourse to political performances such as that of Sophia.

The media spectacle of the Sophia robot has shown that the technology does not need to be mature for the consumer market as long as its performative function reassures investors of its future potentials in developing AI-based robotics. The captivating humanoid appearance of the Sophia robot serves as an excellent actant in the network, with the goal of promoting the usability of service robots as part of future health and education services. As an actant, the Sophia robot acts as a 'lubricating' agent for human attitudes, arousing surprise and disbelief, but above all, it seeks to redefine the social interactions between different actors (Latour 2005). Thus, what is interesting in connecting various actants is not only the confusing properties of the robot itself, but also how the device functions as a mediator to gather R&D investment.

An example of generating new networks is how the Sophia robot can be seen as a mediator between the dictator of Saudi Arabia and liberal Californian scholars despite potential conflicting values and norms in terms of issues like equality and civil liberties. The FII investment forum in Riyadh, Saudi Arabia in 2017 was preceded by the media spectacle in which the Sophia robot was granted Saudi citizenship. What that citizenship meant in practice was not specified in detail by the Saudi authorities or Hanson Robotics. However, the granting of citizenship can be seen as a kind of the culmination point in the political choreography of the Sophia robot. Both the Saudi authorities and Hanson Robotics acted as the political choreographers who had specific aims with the robotic performance.

The aim of the Riyadh FII Economic Forum was to attract hundreds of billions of dollars in investment in new energy sources, biotechnology, robotics and artificial intelligence-based production in Saudi Arabia, among other things, in response to China's new 'Silk Road' geopolitics. The investment forum launched many mega-scale projects, such as the announcement of the creation of a new city of Neom and an economic zone covering an area of 26,000 square kilometres in northwestern Saudi Arabia spanning Jordan and Egypt. The purpose of the new economic area was not only to connect Europe, Asia and Africa, but also to make the new solar and wind-powered city of Neom the best place to live in Saudi Arabia. It should be noted that the FII event was launched and hosted by the Crown Prince of Saudi Arabia, Mohammad bin Salman. His policy was widely condemned in the West after the assassination of journalist Jamal Khashogg by a 15-member squad of Saudi assassins. The extensive arrangements for the 2018 FII Economic Forum were largely cancelled when many invited speakers, companies and media houses refused bin Salman's invitation to come to Riyadh. Although the FII 2018 Economic Forum eventually failed for Saudi Arabia, the 2017 Forum appears to be a successful media performance from the perspective of both Hanson Robotics and bin Salman. The both actors succeeded to promote diplomacy and trade between the US and Saudi Arabia by taking advantage of the media hype of the Sophia robot.

5 Conclusion

In this paper, our purpose has been to evolve a novel conceptualisation of political choreography for exploring political and economic interests behind the performativity of the Sophia robot in media that was carried out globally between 2016 and 2019. To do this, we have discussed the Sophia robot as a non-human actant and a mediator, but also and especially as a device that is used to build political and economic relations. We deliberately did not want to steer this discussion towards a moral debate about whether it is right to grant Sophia civil rights, because such a debate in itself may well support the rhetoric of the mentioned actors and promote the political choreographies they organize. One could even argue that the actors exploited the long-established debate on moral and legal status of robots for their economic purposes. But next to their words the performances of the non-human actant (the Sophia robot) was crucial. To understand performative strategies that are to influence and affect humans, as individuals or as groups—including philosophers and their moral debates on robotics—we have argued that AI-based technologies need not be mature to the consumer market when they generate new R&D resources and investments for AI. This can also be seen as one of the reasons why so many social robot start-ups have been sold or closed down even though they have raised a significant amount of investment capital.

This performance-oriented approach and the concept of political choreography also enabled us to ask who the choreographers of Sophia's performances are, and, more generally, of performances of similar social robots with so-called

"embodied intelligence". Looking beyond the rhetoric about Sophia and going far beyond the usual discussions in HRI and robot ethics, then, this paper has helped to reveal the wider political and economic actors and their performative fields connected to the device. We conclude that our normative attention should not only be directed at the potential moral standing or intelligence of social robots, but also at the political choreographies that shape the performances of which these robots are part and the interests that play a role in these choreographies. While more work can and needs to be done on developing the merger of theoretical perspectives we proposed, this "political choreographies"/"political performances" framework offers a helpful lens to critically discusses cases such as that of Sophia—cases in robotics, but also cases concerning other devices with artificial intelligence.

Funding The authors received no financial support for the research, authorship, and/or publication of this article.

Data availability The data supporting the findings of this study are available within the article (References) and its supplementary materials at URL- or DOI-links. The authors cannot guarantee that all URL-links from commercial operators (e.g., magazines) will function permanently.

Compliance with ethical standards

Conflict of interest The authors declare that there is no conflict of interest or competing interests.

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