

Sex Robots from the Perspective of Machine Ethics

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Abstract. This contribution explains firstly the terms and the phenomena of sex robots and robot sex and the foundations of machine ethics. Secondly it poses questions related to sex robots as moral agents, from a general and a specific perspective, aiming at assisting manufacturers and developers. By using the questions, the opportunities and risks can be discussed in a structured manner. Thirdly, the fields of applied ethics are included to work out the implications for humans as moral patients. At the end, the author summarizes the findings. Machine ethics, from his point of view, may help to construct sex robots and service robots with special capabilities which are moral machines in their appearance and in their behaviour and which may allow some people to complement their sexual activities and to lead a fulfilling life. The fields of applied ethics may be beneficial with respect to the adequate use of sex robots.

Keywords: Sex robots · Sex dolls · Robot sex · Artificial intelligence · Machine ethics · Technology ethics · Information ethics

1 Introduction

The present contribution explains firstly the terms and the phenomena of sex robots and robot sex and the foundations of machine ethics. Secondly it poses questions related to sex robots as moral agents to assist manufacturers and developers. Those are evaluated and explained in detail. Thirdly, the specific ethics (i.e., the fields of applied ethics) are included to work out the implications for humans as moral patients. At the end, the author summarizes the findings.

The analysis of sex robots and robotic sex has become a tradition [13–15, 24]. Robotics, psychology, criminology and sexology all contribute to it, but machine ethics as a consistent perspective is lacking. Some stand-alone questions have been raised in the literature related to the discipline, and there are a few systematic lists of requirements [4]; but there is no pertinent analysis or classification. This article wants to close this gap.

2 Robotic Sex and Sex Robots

Robotic sex, as sex with and among robots, is a subject of science fiction, both literature and film, and of computer games. Today it is also considered for healthcare, for instance to assist handicapped or elderly people, and to support therapies [4]. Newspapers and magazines are enthusiastic about robotic sex [13, 14], and eager academic discussions

are going on about it. Sex with robots, within the meaning of sex between man and machine, is usually handled through sex robots, but other service and even industrial robots also come to question. Sex robots can be defined as robots designed and programmed for the purpose of sex with all kinds of interested and capable people – men and women, gays and lesbians, black and white, teenagers and adults, frail and gross people.

Depending on budget and taste, sex machines and robots are available as a handy toy or as a life-size shape [4]. They help people reach fun and satisfaction through stimulation or penetration. Some have natural language skills and arousing voices, and one should not forget that verbal eroticism is very popular in chats, and phone sex was in high demand for a long time and still is in existence. The sexual interactions in virtual reality applications can also be used for comparison. The advantages of sex robots are their constant availability, the low risk of disease transmission if handled correctly, and unburdening of sex workers of all genders. Their drawbacks are the limited bandwidth of availability and satisfaction, the high risk of disease transmission if handled not correctly, and the current low acceptance by the population.

There are several products and approaches. Just a few examples may suffice. Roxxxxy is a sexbot which according to information from the company's website (www.true-companion.com) is able to listen and speak and to respond to touching. Several personalities can be chosen from, ranging from "Wild Wendy" to "Frigid Farrah". The male equivalent is called Rocky, the name reminiscent of the famous film figure. Companies like Abyss Creations (www.realdoll.com) and Doll Sweet (www.dsdolleurope.com) try to develop lifelike love dolls with convincing skin and flesh [3], and some of them investigate potentials of sex robots. In 2015, media reported that the manufacturer of Pepper cautioned against sex with its conventional service robot [26]. This shows that not only genuine sex robots and love dolls are candidates in this field.

3 The Discipline of Machine Ethics

Machine ethics is a young and dynamic scientific discipline with representatives all over the world. It refers to the morality of semi-autonomous or autonomous machines like service robots, co-robots, chatbots, self-driving cars or certain civil respectively military drones [1, 25]. Hence these machines are new and strange moral agents. They decide and act in situations where they are left alone, either by following pre-defined rules or by comparing the situations to selected case models, or as machines capable of learning [5].

The term of morality in this context has been criticized by scientists and journalists, although it is explicitly referenced to machines, and does not imply that machines behave to the same extent as humans [4]. At least the term "morality" can be applied to machines metaphorically (machine morality is different from human morality, but there are some similarities) or intentionally (one day machine morality will be more or less like human morality).

While the classical special fields of applied ethics rather are reflective disciplines, machine ethics is more of a design discipline, and as such it is close to robotics and

artificial intelligence, or to information science respectively. Some machine ethicists prioritize on designing simulations and prototypes in order to prove the possibility of moral machines or the underlying theoretical assumptions [7, 18].

4 The Perspective of Machine Ethics

In the section below, questions referring to sex robots and robotic sex are posed and discussed from the perspective of machine ethics. As empirical studies are virtually non-existent, analysis of literature, argumentation chains or conclusions are methods of choice. More general questions are posed at the beginning, followed by more specific ones. These might help responsible persons in companies or programmers to develop solutions in forms agreeable to society and individual. Managers of institutions (such as hospitals, nursing homes, or brothels) also can benefit from the considerations. The intention is not to list only complaints and limitations; the goal is to enable the creation of robots that as an entity fulfil the requirements, demands, and needs of operators, users and affected persons (meaning role models for robots as well as partners or relatives of owners).

4.1 General Questions in the Field of Machine Ethics

Machine ethics is one of several disciplines the design and programming of sex robots can refer to, next to psychology, social robotics, and robotics in general, as well as artificial intelligence and human-machine interaction [3, 10]. The general questions of machine ethics in this context are [4]:

1. Should the sex robot have moral skills, and if yes, which ones?
2. Should it follow defined rules only (duty ethics), or should it be able to estimate the consequences of its actions (consequential ethics) and weigh pros and cons for decision-making?
3. Do other normative models apply, for instance the ethics of virtue or the contract theory?
4. Should the moral machine be implemented as a self-learning system, and if yes, how should it learn?
5. How autonomous should the sex robot be, and for which reason?

The answer to the question whether or not the sex robot should have moral skills (question 1) has to consider the moral situation the human sex partner of the sex robot frequently can be in. He might worry about general questions of the usage, for instance if it is right for his own present and future life, or if the environment might be opposed to it. On the one hand, the robot as a moral machine could reduce the reservations of friends and family by explaining certain aspects; but on the other hand it might stipulate critically analysis of its handling. General moral skills are a consideration, as sexual interaction is embedded in social interaction where good and evil behaviours can always develop.

Models of normative ethics have been discussed with regards to robots for some time (questions 2 and 3). Especially the classical models, linked to Aristotle or Immanuel Kant, seem to be particularly suitable [6]. Thinking in terms of consequence ethics or duty ethics, this might be due to their level of abstraction. Virtue ethics raises special requirements, on the one hand, virtues as such are describable, and on the other hand, they usually are genuinely human characteristics and targets. Other models created in the 19th and 20th century focus even more on the human as a moral agent and moral reference. The existentialist concept founded by Søren Kierkegaard is known as existential ethics. Ethical considerations concentrate on the human existence. Transferring such concepts to machines without strongly modifying the character of these philosophies is difficult.

The question if the moral machine should be designed as a self-learning system leads into deep, controversial discussion (question 4). Some authors think it is advisable, at present or in general, to limit the considerations to simple moral machines or operational moral [8, 25]. For them it is often enough to follow a comprehensive number of rules; often they are underway in semi-open worlds, for instance in households (as vacuuming robots that spare animals), or in parkways (as mowing robots that spare flora and fauna). In open worlds, for instance in traffic or at war, more complex machines seem to be necessary, and high learning capacity contributes to enable them to rate more and more situations, but there is disagreement on whether this kind of development of the morality of machines is purposive. Is sexual interaction a moral situation that is easy to overview or impossible to overview? This depends on the human sex partner and on his or her ability to change and learn. It is safe to assume that a complex person will require a complex machine, but this does not mean it will be able in the end to satisfy particularly well, or to make the human happy. Maybe adjustability is just as important in sexuality as in moral matters.

The degree of autonomy of sex robots again depends on their application and on the user profile (question 5). In terms of sexuality, one can distinguish passive and active behaviour. An active human might be satisfied with a passive counterpart, while a passive human might want a more active one. Autonomy and morality generally are closely interrelated; the same can be said for machines. An autonomous system comes into many different situations, some of them are morally charged, and it has to be able to rate and master them on its own. Vice versa, complex situations might overwhelm autonomous machines. It is possible to create sex robots that are able to master standard situations and in extreme situations would recommend or obtain human support, either from their counterparts or from uninvolved persons. The prerogative is to classify situations in normative terms in advance, and this is possible on principle. The GOODBOT, a chatbot developed out of machine ethics in a project at the School of Business FHNW in 2013/2014, for instance was taught to recognize problems of the user, if expressed by speech, and to escalate them on three levels [7]. On the highest level, it will give out a national emergency hotline number. This would be an adequate action also for a sex robot to take in case of medical or psychological problems.

4.2 Specific Questions in the Field of Machine Ethics

Some general questions have been posed and discussed. There are also more specific questions, when we focus on the sex partner in a stronger way and when we consider not only the robot's behaviour but also its appearance [4]:

6. Should the robot become active on its own, and entice the partner to have sex?
7. Should it be able, in extreme cases, to refuse performing the act?
8. Should it make clear to the human being that it is no more than a machine?
9. Should design and realization fulfil moral criteria, for instance should child-like sex robots be prohibited?
10. Should the appearance be "politically correct", in terms of race and ethnicity, and what does this mean concretely?
11. Should there be novelty options for stimulation and seduction, or should the sex robots follow human role models?
12. Should conventional service robots feature extensions to enhance the possibilities or should they be as "unsexual" and "neutral" as possible?

Whether or not the robot should become active on its own, and entice its partner to have sex (question 6), relates to the already discussed issue of autonomy and activity or passivity. Here, the more specific question is in how far the sex robot should be an initiator, a seducer, or a driver. This leads to questions about the relation between human sexuality and machine sexuality. Human sexuality has physical limits, and especially male sexuality is limited by increasing age. If the sex robot overexerts its counterpart, the counterpart will hardly have opportunity to have intercourse with human partners. Other physical and psychic aspects are caused by exhaustion and strain. Falling into normative categories is too simple. Once one has decided to sexually interact and communicate with preference with machines, there is no reason why moral aspects should be over-emphasized. The only aspect worthy of discussion would be in how far a partner, who was given a promise on the type of relationship, either implicitly or explicitly, would be neglected or repelled by the interaction. Of course, one may submit recommendations for the implementation in order to prevent extreme loads. Machine ethics could help to realize sex robots which do not overexert their counterparts.

The question of rejection and refusal by the machine (question 7) is interesting not only in the sexual context, but also in contexts where criminal deeds or morally inadequate actions are at disposal. Again, this is related to the matter of autonomy. The extent of autonomy would be high enough for the machine to cast off its tool-like character and to be an actor on its own, if without free will or self-confidence. An act of refusal could let the machine appear more human, with all the advantages and disadvantages this entices, and demonstrate that limits in interactions with machines must not necessarily dissolve, but could be defined by responsible persons to be implemented by machines. On the one hand, this could be interpreted as an indication of the sexual autonomy of humans the user still might have interaction with; on the other hand, it could lead to frustration, especially if the user has suffered rejection from humans repeatedly before. It is important to reflect these problems before a concretion in machine ethics.

Some experts have requested that machines have to make clear they are only machines (question 8). The “principles of robotics” by Margaret Boden, Joanna Bryson, Darwin Caldwell and others claim with a view to robots that “their machine nature should be transparent” [9]. Oliver Bendel proposes a V-effect for robots, an alienation effect in the tradition of Bertolt Brecht: The human shall be torn out of the illusion every now and then [12]. Illusioning is a very old cultural technique, applied in literature, movies and theatre, and not objectionable as such. However it can be desirable for the user to remain able to judge and criticize political and social conditions, as was the intention of the socialist poet and playwright, or one’s own constitution, as is relevant in this context. The sex robot can dampen expectations for feelings and relations, and can show other means for sexual fulfilment beside it. Repeated demonstration of the machine that it is only a machine might lead to perceiving it more than ever as a human being because it has strategies of redundancy and transparency one would not necessarily expect from an artefact, and application of language technologies almost inevitably leads to anthropomorphization. This issue should be further explored in machine ethics and robot ethics.

Machine ethics normally analyses the morality applied in decisions and actions of machines. It can also deal with their visual design, the specification of their outward appearance, and set them in relation to morality (question 9). The question of whether or not sex robots resembling children are permissible is discussed intensively [11]. Taking a look at virtual worlds first is worthwhile. According to reports in the media and from eyewitnesses, adults frequently sexually assault children in Second Life; but it is probably safe to assume the virtual children are played by adults in reality [17]. Obviously these are pertinent role plays or plays with age (“age play”), known from chats and computer games and other spaces. According to the Second Life Wiki (wiki.secondlife.com) child avatars generally are permissible but with several exceptions. “Child avatars in sexual situations (sexual congress obviously, though it is unclear beyond this) are not allowed and abuse reportable...” Also “child avatar nudity of the genital or chest regions, including in otherwise non-sexual situations (skin vendors, for example) can be a violation”.

Hardware robots obviously add a physical dimension. Certain behaviour is practiced on a machine of childlike size and features. Users are active virtually by manipulating avatars or figures. In reality, users also use their hands, arms or genitals to manipulate the machine. This can be considered ethically questionable; or medicine, psychology and sexology can be consulted. If childlike sex robots could help reduce sexual abuse of children, they might be an instrument in and beyond therapy. If they increase sexual abuse of children by assisting the training of behaviour in a fictional-real test situation, and this behaviour later unfolds in social reality, they have to be questioned with regard to morality, and legal consequences have to be addressed.

When it comes to visual design, gender, ethnicity (colour of skin and hair), size, weight etc. have to be considered (question 10). If the robot has to have a gender, and a certain gender at that, will the mass of developments have the face or body of a woman? Feminists have objected frequently; they argued that sex robots with female design are technical reductions sacrificing female persons to the male phantasy, making them sexual objects [19, 22]. Today however the sex toy market, which has grown strongly [16],

addresses mainly women, and the conditions have been reversed. Not only are men eliminated as sexual partners by vibrators and dildos, they even are reduced to their genitals, but this has few caused complaints or public discussions. Obviously, it is considered normal to use an artificial member for stimulation while some social circles are alienated by the concept of using an artificial human resembling a woman for sexual satisfaction. Maybe the non-reduction in the technical segment, the full-body representation, is linked to the reduction in the biological segment, and fully artificial vaginas might be less repulsive. Such items are also available on the market, for instance the Deluxe Masturbator Pussy to Go or the Fleshlight Girl Riley Reid Lotus Male Masturbator, and just as sex robots, they are debatable, considering that versions like Deluxe Pussy Little Miss are available which – because of their size or tightness – again lead to the discussion about age. There are very few findings about the ethnicity of sex robots; it has to be assumed that the exclusive use of one skin complexion or the total lack of human skin complexion would cause irritations.

Should there be novelty options for stimulation and seduction or should machines follow human standards or role models (question 11)? Partly this question again relates to the visual design, but partly also to the behaviour of machines. Futuristic machines that arouse and satisfy new sexual needs are a topic of science fiction books and movies; and machines such as Fuckzilla contribute to a better understanding of the exact options [4]. David Levy and Georg Seeblen have shown that pertinent artefacts have differed from human standards for centuries [15, 23]. If a machine is furnished with more than two hands and two breasts and several genitals etc. users might get used to this plurality, and be disappointed when this is not found on a real person. The user might also be repulsed, or amused, by the additional options. Of course such speculations have to be overcome by interviews and tests. In total, a variety of appearance and behaviour might be fruitful, and inspire human relationships, even if they don't apply technology.

It was shown in different real-world contexts that robots can be applied to other than the designed purposes [2]. The police for instance has used service robots in order to eliminate criminals [21]. The user manual of a humanoid robot called Pepper says, as already mentioned, that users must not subject it to sexual activities [26]. Otherwise penalties would apply, but which penalties would apply, or who would execute them is not specified, and how the manufacturer plans to uncover sexual activities performed on the robot it is not at all explained. This already indicates the relevance of questions from special fields of applied ethics, for instance on the monitoring or informational autonomy. The limbs and body parts one could have sex with remain unclear. SoftBank Mobile Corp. took its warning even further, and beyond the body. Software adjustments for giving Pepper an erotic voice are forbidden. It is interesting that the French-Japanese product shows emotions, and stimulates emotions in others. It seems these emotions shall be restricted to a tight corset and not destined for falling in love and getting tangled up and trapped.

The question is should the design of service robots be generalistic so they could be used for sexual interaction and communication, or should they even have special tools to predestine them for this purpose (question 12). This leads to the next question: are special sex robots necessary, or could certain service robots be used for the purpose, considering how this would lower the inhibitions to purchase and operate one.

Companies like Abyss Creations and Doll Sweet show the outer appearance can be taken very far to create strong sexual connotations through visual design alone. In order to realize such an effect, but not to overemphasize it, service robots would have to be furnished with digital elements such as displays. This is done to simplify facial expression, but under certain circumstances this might limit haptic options as well as physical stimulations.

5 The Perspective of the Fields of Applied Ethics

Machine ethics as a design discipline seems to be crucial in developing adequate sex robots, but applied ethics with its reflection approaches is also important. Below some questions from this perspective [4]:

13. How to process the data the sex robot collects and evaluates to better satisfy the partner's needs or to inform companies?
14. Who is liable for injuries or contamination caused by the use of the machines?
15. How to handle frustration, uncertainty, shame, disgrace and jealousy caused by the sex robot?
16. It is possible to be unfaithful to the human love partner with a sex robot, and can a man or a woman be jealous because of the robot's other love affairs?
17. Does the robot replace, complement or support a human partner?
18. Is robotic sex an indication of raw and crude tendencies, e.g., by promoting the idea that a sex partner has to be available at all times?
19. Should sex robots be available everywhere, and should it be possible to use them everywhere and anytime?
20. Should children and teenagers be permitted to have access to sex robots, and, if so, under which circumstances?

These questions might be answered from the perspective of information, technology, business, medical and sexual ethics. Partly they are also related to legal matters. Responsible persons in companies (CEOs and managers), programmers, and legislators could benefit therefrom.

Intensive discussion cannot take place in this article because of the limited length. The first question shall be discussed briefly because it was touched in the last paragraph (question 13), as well as the last one, especially because it seems so unusual and unambiguous. Some robots, like security robots, have been developed purposively for surveillance and monitoring. The K5 and the K3 from Knightscope recognize abnormalities, and report them to a headquarter [20]. What if the sex robot or a robot used for sex is just as indiscreet? What if it collects and discloses information on sexual practices, or records them in audio or visual form, and disseminates the recordings? There might be rational and functional reasons for data collection and recording, for instance for product improvement or the detection of weaknesses or errors. On the one hand, endangering the autonomy of information is potentially detrimental to the user; on the other hand, it is detrimental to the acceptance of sex robots. A childlike sex robot might report being used outside of therapy, and warn of imminent danger. An adult one might report being

beaten and hurt, which could be interpreted as crossing a border and worthy of more detailed investigation. Sending out artificial spies to explore human sex life however would be a kind of abuse in itself.

As already mentioned this article does not go into questions 14, 15, 16, 17, 18 and 19. Should children and teenagers be granted access to sex robots (question 20)? Obviously the answer to this question is simply no. There are many reasons why children should make their very first sexual experiences, if at all, with other children. Doctor games with robots would be played in a certain imbalance. Children cannot really discover the other gender, or their own gender in relation to another person, they can only detect metal, silicone, and programming versions. Not to forget question 13 as discussed in the previous paragraph. Guiding kids towards technologies that might spy them out is dangerous, and it is also unfair if they cannot see through, or overview and estimate, the products and processes. The same can be said for teens, especially relating to the very first sexual experience. But what if they already had been sexually active, but cannot be sufficiently active for what reason so ever? Perhaps there are no good reasons not to grant 16 year olds access to sex robots. But we must be very careful regarding the development of adolescents, and in individual cases it might be better to avoid a “first contact” at an early stage.

6 Summary and Outlook

All in all robot sex is a highly sensitive field [4]. Those who are substituted by a focused machine might feel rejected. Those who have to have intercourse with a sex robot for having no other choice might suffer, as well as those who cannot afford such a high-end gadget. The matter raises marginal practical questions, which cannot be analysed in depth here. A dildo or vibrator can be stored discreetly, a sex robot cannot. Only very few relationships will be able to integrate a machine like that.

Machine ethics may help to construct sex robots which are moral machines in their appearance and in their behaviour. After the right questions have been posed, the right answers have to be provided, which is the job of machine ethicists, roboticists and sex experts – and of the whole society. This article raised and discussed questions from the perspective of machine ethics, and partly from selected special fields of applied ethics. Here and there it was possible to give answers and propose solutions.

References

1. Anderson, M., Anderson, S.L. (eds.): Machine Ethics. Cambridge University Press, Cambridge (2011)
2. Bendel, O.: Überlegungen zur Zweckentfremdung von Robotern. In: inside-it.ch, 18 August 2016. <http://www.inside-it.ch>
3. Bendel, O.: Die Sexroboter kommen: Die Frage ist nur, wie und wann. In: Telepolis, 13 June 2016. <http://www.heise.de/tp/artikel/48/48471/1.html>
4. Bendel, O.: Surgical, therapeutic, nursing and sex robots in machine and information ethics. In: van Rysewyk, S.P., Pontier, M. (eds.) Machine Medical Ethics, pp. 17–32. Springer, New York (2015)

5. Bendel, O.: Wirtschaftliche und technische Implikationen der Maschinenethik. *Die Betriebswirtschaft* **4**, 237–248 (2014)
6. Bendel, O.: Towards machine ethics. In: Michalek, T., Hebáková, L., Hennen, L., et al. (eds.) *Technology Assessment and Policy Areas of Great Transitions. 1st PACITA Project Conference*, 13–15 March 2013, Prague, pp. 321–326 (2014)
7. Bendel, O.: Good bot, bad bot: Dialog zwischen Mensch und Maschine. *UnternehmerZeitung* **7**(19), 30–31 (2013)
8. Bendel, O.: Ich bremsen auch für Tiere: Überlegungen zu einfachen moralischen Maschinen. In: *inside-it.ch*, 4 December 2013. <http://www.inside-it.ch/articles/34646>
9. Boden, M., Bryson, J., Caldwell, D.: *Principles of robotics: Regulating robots in the real world. Guidelines for engineers and roboticists from a EPSRC/AHRC funded retreat* (2010). <https://www.epsrc.ac.uk/research/ourportfolio/themes/engineering/activities/principlesofrobotics/>
10. Coeckelbergh, M.: Personal robots, appearance, and human good: a methodological reflection on roboethics. *Int. J. Soc. Robot.* **1**(3), 217–221 (2009)
11. Danaher, J.: Robotic rape and robotic child sexual abuse: should they be criminalised? In: *Criminal Law and Philosophy*, pp. 1–25, 13 December 2014
12. Freuler, R.: Was hat Sex mit Technologie zu tun? In: *NZZ am Sonntag*, pp. 60–61, 23 October 2016
13. Hänbler, B.: Stets zu Liebesdiensten. In: *Stuttgarter-Zeitung.de*, 29 August 2012. <http://www.stuttgarter-zeitung.de/inhalt.sexroboter-stets-zu-liebesdiensten.59ec16f3-55c3-4bef-a7ba-d24eccfa8d47.html>
14. Hartwell, L.: So who wants to f**k a robot? In: *Wired.com*, 10 June 2007. <http://www.wired.com/underwire/2007/10/so-who-wants-to/>
15. Levy, D.: *Sex and Love with Robots. The Evolution of Human-Robot Relationships*. Harper Perennial, New York (2008)
16. Möthe, A.: Sexspielzeug statt Tupperware. In: *Handelsblatt*, 27 February 2015. <http://www.handelsblatt.com/unternehmen/handel-konsumgueter/boom-der-erotik-branche-sexspielzeug-statt-tupperware/11430194.html>
17. O’Hear, S.: Second Life child pornography investigation. In: *ZDNet*, 10 May 2007. <http://www.zdnet.com/article/second-life-child-pornography-investigation/>
18. Pereira, L.M., Saptawijaya, A.: *Programming Machine Ethics*. Springer, Cham (2016)
19. Richardson, K.: The asymmetrical ‘Relationship’: parallels between prostitution and the development of sex robots. *SIGCAS Comput. Soc.* **45**(3), 290–293 (2015)
20. Rötzer, F.: Chinas erster Überwachungsroboter. In: *Telepolis*, 13 May 2016. <http://www.heise.de/tp/artikel/48/48232/1.html>
21. Rötzer, F.: Dallas: Umfunktionierter Bombenroboter zur gezielten Tötung eines Verdächtigen. In: *Telepolis*, 8 July 2016. <http://www.heise.de/tp/artikel/48/48771/1.html>
22. Scheutz, M., Arnold, T.: Are we ready for sex robots? In: *HRI 2016: The Eleventh ACM/IEEE International Conference on Human Robot Interaction*, March 2016, pp. 351–358 (2016)
23. Seeßlen, G.: *Träumen Androiden von elektronischen Orgasmen? Sex-Fantasien in der Hightech-Welt I*. Bertz-Fischer, Berlin (2012)
24. Sullins, J.P.: Robots, love, and sex: the ethics of building a love machine. *IEEE Trans. Affect. Comput.* **3**(4), 398–409 (2012)
25. Wallach, W., Allen, C.: *Moral Machines. Teaching Robots Right from Wrong*. Oxford University Press, Oxford (2009)
26. Wendel, J.: Pepper The Robot soll nicht für Sex benutzt werden. In: *Wired*, 24 September 2015. <https://www.wired.de/collection/latest/eine-passage-im-nutzervertrag-von-pepper-robot-verbietet-sex>

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