Sexual Robots

Subjects: Others

Contributor: Carina González González

The area of human-robot interaction (HRI), particularly concerning sexual robots, has begun to attract interest in various social issues, such as emotions, ethics, philosophy, and psychology. These new relationships between sexual robots and humans have also awakened the interest of the media, the industry, and the maker world since with a 3D printer, it is already possible to create a sexual robot. Society has begun to consider the idea of having sex with robots, and there is the belief that this will be normal in the future. Although there is still no scientific evidence of its therapeutic benefits, many think it can help treat sexual dysfunctions or even help decrease women's sexual exploitation. Like sex toys, some experts consider sexual robots (or sexbots) to be the future of sex relationships potentially.

sexual robots   ethics   gender

1. Background

The realism of sex dolls has increased over the years. We begin by comparing their evolution from the 17th century, where such dolls were first made of fabric, to those in the 1970s made of latex, silicone, and inflatables, and lastly, to the sophisticated models with artificial intelligence today. We can see that the market has changed greatly [1]. In this section, we present some of the current models of sexbots.

To date, there is no consensus on a unique definition of sexual robots, also known as sexbots [2]. We can compare sexbots to sex toys because both are created to have sex with humans [3]. However, sexbots can cause emotions in people, such as love [4]. There are different research areas interested in exploring these new relations among sexbots and humans [5][6][7][8][9][10].

Sexbots are a kind of social robots, ones that are personalized, intimate companions. In most cases, sexbots are personalized according to male fantasies. However, both men and women can acquire different models in the market, such as Roxxxy [6], Harmony [7] (Figure 1), or Henry [8] (Figure 2).

Designers of sexbots need to consider the temperature, the psychological and physical issues, among other customizable elements [1]. Besides, some of these sexbots also have a certain intelligence [9]. They can be a reactive machine (i.e., perceive the world and act in consequence), have memory, be based on mind theories, or have self-awareness. In the last case, robots with self-awareness can be considered a sentient robot.

Figure 1. Harmony, marketed as "the perfect companion" with artificial intelligence (Source: http://www.sickchirpse.com/biggest-worry-men-sex-robots/).

Figure 2. Henry, male version with artificial intelligence (https://realbotix.com/).

2. How Are Sexbots Designed?

In a previous work [11], we found that there are different approaches to sex robot design[12][13][14][15][16][17][18][19][20][21], of which we can highlight two [13], i.e., the functional ones, which are not based on cognitive functions in designing social robots, and the biological ones, which are based on cognitive models and natural sciences. Furthermore, we can observe other methods coming from biomimetic robotics [12], social robotics [14], and biohybrid neuroprosthetic systems related to biomedical engineering and neuroscience [17][18]. Based on this systematic review, we see that there has been a greater interest in the opinion of human users within the past ten years, more specifically, in men, about how a sex robot should be designed. We hardly found any articles on designing the functionality or the possible biological inspirations that a sex robot's design may have. Moreover, studies on comparisons between sexbots/sex dolls and human beings deduce exactly which qualities are the most attractive [22]. Again, more studies have been done on sex dolls and sex robots for male users [23]. We wonder whether these studies will be decisive when designing sexbots.

Considering this systematic review results, we can note that there are sex differences in male and female faces and voices [24]. Males prefer more female voices and stimulus. Some sex toys might also help people with disabilities and people in long-distance relationships (LDR) [25]. Also, there are guidelines for helping individuals and relational systems make informed choices regarding participation in technology-based activities [26].

3. How do Sexbots Interact with Humans?

A sexbot is a social robot [19][27] that can interact with humans through vision (through cameras), voice (through microphones and speakers), touch (through capacitive sensors or contact microphones), cognition, and emotion (through cognitive modeling and behavioral responses, perceiving, and expressing emotions) [19].

For example, Samantha [20] is a sexbot who has sensors on her hips, shoulders, vagina, and mouth and can respond to touch. Besides, it has a sexy or familiar mode, programmed with artificial intelligence, and users decide the context they can interact with it in one way or another.

 Based on our systematic review, the affective aspect can be essential. For instance, in the movie *Guys and Dolls* [27], we find a protagonist in love and married to his robot. Other mechanisms are put in place in the relationships between humans and sex robots apart from sexual ones, as shown in the documentary, such as control relationships. One male protagonist, who collects different sex robots in his garage, feels he will never control a

real woman in the same way as controlling a robot. Another type of relationship is based on being a hobby, that is, as long as an interesting woman does not appear, the user continues to be with a sexbot.

The relationships between human beings (males in this case) and their sex robots also can be very complex, as an analysis in a sex forum demonstrated [28]. The most cited reason was "doll maintenance" for interaction among peers. The study found that peer bonding was the primary factor driving member interaction—a result consistent with studies of pornography forum fan pages in which collectivity and peer approval are paramount in online sexual cultures. Movies such as *2040* [29] fantasize the sexual relations between human beings and what they called "anabots", particularly in the scenes that dramatize sex between anabots and humans, allowing the film to comment on the role that technology has.

There is a lack of empirical analyses of doll ownership psychological characteristics or behavioral implications. No standardized measure of the attitudes towards sex dolls and robots and their owners exists [30]. Moreover, sex therapists and physicians have different opinions about the therapeutic benefits of sex robots [31]. However, the attitudes toward sex robots as a therapeutic tool were very heterogeneous, depending on gender, age, and occupational differences. Psychologists (in contrast to physicians) were more critical toward the therapeutic use of sex robots. The most frequent use was seen in patients with social anxiety that prevents a sexual life.

One study showed that sex dolls are used for more than just sex [32]. Some owners use dolls to create a sort of embodied intimate fiction. Intimate fantasies are persuasive if they are customizable, which is a characteristic that can be considered in the design of sex robots. In this sense, there is a high prevalence of nonsexual, posthuman companionship dynamics between dolls and their owners [33]. Media representations of intimate human-robot relationships were studied by [34], who found that such representations portray the involved human partner as a disadvantaged man in interpersonal relationships.

Some authors tried to understand the implications of introducing emotions into robotic machinery [35]. In the future, robots can experience emotionally and sexually satisfying partnerships; perhaps the emphasis should be once again placed on humans. The relationship between machines and humans has been studied under the concept of good sex and complete sex, and in this case, their mutual respect is needed [36]. Humor can be another component in the interaction between humans and robots [37]. However, acceptable types of humor should be carefully selected.

4. What Gender and Ethical Issues Are Related to the Design and USE of Sexbots?

We have organized the discussion on this question in two subsections: a) gender approaches and b) ethic approaches. Following, we present the main related findings.

4.1. Gender approaches

In our review, almost no study was found regarding women using male sex robots except in [31]. In this way, both the design and the interaction are biased because a male hegemony is seen. A female perspective is needed to guarantee gender equity.

Some authors [38] focused on relationships, concretely on jealousy. As we saw in the interactions between humans and robots, as the manufacture of sexbots is perfected, the relationships between humans and these robots will become more complex. Therefore, when the sexbot does not have a single function, and a romantic or emotional relationship appears, gender differences appear between a platonic love robot and a sex robot, in that the robot becomes a partner. In an online study (i.e., a vignette about a sexual robot), females have less favorable views of robots, especially sex robots, compared to men. This means that women place more importance on the fact that their partner got a sex robot rather than a platonic love robot, and females are expected to feel more jealous. Females who read about sex robots reported significantly elevated levels of jealousy, less favorable attitudes, a greater level of dislike, and a greater level of a predicted partner's dislike. The fear of the unknown, or the partner's insecurities, is projected onto the partner, causing jealousy to appear.

Media representations of intimate human-robot relationships are also biased. In this sense, some authors [34] explained how media representations of intimate human-robot relationships portray the involved human partner as a disadvantaged man in interpersonal relationships. Therefore, media often portray the involved robot partner as a female humanoid sex robot. Nonfictional media describe intimate human-robot relationships more often in sexual terms because a product or service is offered; fictional media focus more on emotional aspects because this involves a fantasy. Media representations of intimate human-robot relationships reveal stereotypical gender roles, heteronormativity, and a focus on sexual versus emotional intimacy. In all its variants, such as comics, series, books, or movies, science fiction provides habitually hypersexual heroines.

Articles in the past decade focus more on concrete interactions. Some researchers [39] explored the gender affordances of conversational agents. Their examination takes a holistic approach in analyzing the application of gender stereotypes to nine chatterbots: six embodied (three male and three female), two disembodied (male and female), and a robot embodiment. Feeling accompanied is not only achieved by physically having an object or someone close. Affectivity again appears as a recurring theme in this field. For this reason, a conversation thought of as an affective interaction is an element that must be taken into consideration. The authors tested the persistence of gender stereotypes in selecting conversation topics (the referential aspect of conversation) and the elicitation of disinhibition and verbal abuse (the relational aspect of conversation). Two main hypotheses were formed, with the first one on a gender-related conversational topic hypothesis. In other words, conversations with female-presenting agents will revolve more around social relations and physical appearance than conversations with male-embodied agents. These can be seen in some everyday examples, such as the conversational agents around us; they usually have a female voice and a woman's name, such as Alexa, Cortana, or Siri. For the second hypothesis, i.e., the so-called disinhibition hypothesis, the authors expected that conversations with male-presenting agents would more frequently focus on activities than conversations with female-presenting agents. As females are often perceived to have less status and are usually objects of sexual attention, female agents are expected to be the recipients of more disinhibited behavior. In particular, it is expected that female-presenting

agents would be the recipients of more sex talk and verbally abusive behaviors than male-presenting agents. It should be noted that this is a risky hypothesis if the sample of users is not biased concerning sexual orientation. They concluded that gender stereotypes tend to affect interaction more at the relational (style) level than at the referential (content) level of conversation. Usually, people attribute negative stereotypes to female-presenting chatterbots more often than male-presenting chatterbots. Female-presenting chatterbots are more often the objects of implicit and explicit sexual attention and swear words. They claimed a more informed analysis of user interactions that considers the full range of user interactions.

Moreover, we consider other groups with different sexual orientations because users follow stereotypical gender patterns when conversing with chatbots presented as either male or female. These gender patterns tended mainly to affect the relational aspect rather than the referential aspect of the conversation. This bias is seen in the investigation. The application of gender stereotypes in the interaction with chatbots often leads to more dismissive attitudes toward women than men.

4.2. Ethics approaches

Fortunately, various laws to protect the most disadvantaged individuals, such as children, have appeared in this past decade. Governments should try to protect all these cases that appear, including possibilities that we could not yet imagine.

New crimes under the Sexual Offences Act 2003 (SOA) that address the creation, distribution, and possession of child sex dolls and robots where a real child is involved in their creation has been proposed by [40]. Where sex dolls and robots are fantasy creations, it is argued that different considerations arise, and it is difficult to justify the same range of restrictions. Accordingly, separate SOA offenses are suggested, with exceptions made for self-made artifacts intended solely for private use. In this way, the law adapts to the origin of the sexbot, its conception, and the original idea, separating the fantasy from the physical world's replica.

One point to always keep in mind is that there is a business chain involved, i.e., the distributor, the seller, the supplier, and the consumer. In this line, we seek to answer questions about what is provided, who consume it, and what they do with it since it can be for their own consumption or redistribution. For laws to be efficient, they must consider all these aspects.

The debate about "seeing the glass half full or half empty" is a common denominator in all these challenges that we must face as a society. Are these products and services an opportunity to help people with sexual or relationship problems [41]? Alternatively, should they be prohibited because they are something that is against nature? An essay about the legal regulations about child sexual robots [42] highlighted the "dark field" problem where the restrictive approach to regulation is the wisest choice because when there are children in the way, they must be protected at all costs not to be attacked under any circumstances, which is a point also addressed in [43]. However, all individuals must be protected. In the ethical safeguards into sexual robots, [44] conducted a literature review about the artificial morality in robots/agents because commercializing sex with robots could reinforce existing gender

inequalities and sexual objectification. Some issues are considered the "no consensus", which depends on the culture. This was examined by [45], who explored whether it is conceivable, possible, and desirable that humanoid robots should be designed such that they are capable of consenting to sex. They considered the reasons for giving both "no" and "yes" answers to three questions by examining the concept of consent in general, as well as critiques of its adequacy in the domain of sexual ethics, the relationship between consent and free will, and the relationship between consent and consciousness.

Also, the frame problem where there is an evaluation of the consequences of the acts, was faced by [44], considering that this evaluation involves ethical behavior. This ethical behavior is the object of the evaluation. Another aspect is the ethical boundaries that can be approached by simulating ethical dilemmas. As a particular objective, it was proposed to contribute to the moral philosophy, assuming that perhaps some traditional theories should be challenged to codify ethics.

On the positive side, in their ethical and social implications of translating embodied AI applications into mental health care across the fields of psychiatry, psychology, and psychotherapy, [46] conducted a literature review of new modes of treatment, opportunities to engage hard-to-reach populations, better patient responses, and freeing up time for physicians. A lack of guidance on the development of AI applications, their clinical integration, and health professionals, as well as missing points in ethical and regulatory frameworks, are challenging. There is a potential for misuse from a realistic vision, including using the technologies to replace established services, thereby potentially exacerbating existing health inequalities. Values such as harm prevention and data ethics issues were also highlighted.

The point of view on sex robots will need to be clarified [47] and challenged as technology advances towards sex robots with "awareness". While it may be possible to name a multitude of studies on creating artificial consciousness, it appears that to date, no one has yet formulated an unquestionable definition of consciousness since the existing definitions are speculations and models of how consciousness is believed to operate. The nature of consciousness has been and continues to be studied, but there is no unified explanation of how it can be generated. The debate about whether it can be generated in the distant future is also open for debate. However, in the past decade, articles such as [1] speculating the ethical limits and legal implications of customizable human-like robots, which must be addressed urgently, propose a duty that humans have as creators to safeguard the interests and minimize the suffering of created sentient beings before technological advances preempt this possibility. How we design and customize sexbots and how we treat them matters for us, as well as the future of human/human, human/sexbot, and sexbot/sexbot intimate relations for the sake of achieving harmony between humans and sexbots. Moreover, these questions are part of a broader debate on what ethical duties humans as creators owe the sentient entities they create. Codes of ethical design and flexible regulation that build upon and expand existing ethical codes governing intelligent and autonomous systems to balance and safeguard human interests and the created sentient, self-aware entities must be put in place urgently before technological advances preempt them.

Philosophical essays about the nature of sex robots or their behavior are analyzed about the concepts of life and death [48]. There is a struggle between these two concepts when an inanimate subject comes to play. A revision of

traditional philosophical theories supports this relationship.

The distance between a robot and a person causes some authors to find human nature ethics, such as deontological or consequential ethics, as not adequate to be applied in a machine's hypothetical moral [49].

References

1. Mackenzie, R. Sexbots: Customizing them to suit us versus an ethical duty to created sentient beings to minimize suffering. Robotics 2018, 7, 70. [Google Scholar] [CrossRef]

2. Bhaumik, A. From AI to Robotics: Mobile, Social, and Sentient Robots; CRC Press: Boca Raton, FL, USA, 2018.

3. Levy, D. Love and Sex with Robots: The Evolution of Human-Robot Relationships; Harper Perennial: New York, NY, USA, 2009. [Google Scholar]

4. McClelland, R.T. Confronting Emerging New Technology: The Case of the Sexbots. J. Mind Behav. 2017, 38, 247–270. [Google Scholar]

5. Cheok, A.D.; Levy, D.; Karunanayaka, K. Lovotics: Love and sex with robots. In Emotion in Games; Springer: Cham, Switzerland, 2016; pp. 303–328. [Google Scholar]

6. Taylor, J. Sex Robot with a Personality Unveiled. Roxxxy. Metro. 2010. Available online: https://metro.co.uk/2010/01/11/worlds-first-sex-robot-with-a-personality-unveiled-as-roxxxy-23255/ (accessed on 29 September 2020).

7. Harmony Realdoll. Available online: https://realbotix.com/ (accessed on 29 September 2020).

8. Meet Henry, the Robot with Superhuman Sexual Prowess, Hoping to Titillate Women. 2018. Available online: https://www.rt.com/news/427246-male-sexbot-women-companionship/ (accessed on 29 September 2020).

9. Hintze, A. Understanding the Four Types of AI, from Reactive Robots to Self-Aware Beings. 2016. Available online: https://theconversation.com/understanding-the-four-types-of-ai-from-reactive-robots-to-self-aware-beings-67616 (accessed on 29 September 2020).

10. Cheok, A.D.; Zhang, E.Y. Sex and a History of Sex Technologies. In Human–Robot Intimate Relationships; Springer: Cham, Switzerland, 2019; pp. 23–32. [Google Scholar]

11. González-González, C.S.; Gil-Iranzo, R.M.; Paderewski, P. Sex with robots: Analyzing the gender and ethics approaches in design. In Proceedings of the XX International Conference on Human Computer Interaction (Interacción '19); Association for Computing Machinery: New York, NY, USA; pp. 1–8. [CrossRef]

12. Prescott, T.J.; Lepora, N.; Verschure, P.F. A future of living machines? International trends and prospects in biomimetic and biohybrid systems. In Bioinspiration, Biomimetics, and Bioreplication 2014; International Society for Optics and Photonics: Bellingham, WA, USA, 2014; p. 905502. [Google Scholar] [CrossRef]

13. Prescott, T. The 'me' in the machine. New Sci. 2015, 225, 36–39. [Google Scholar] [CrossRef]

14. Moulin-Frier, C. DAC-h3: A proactive robot cognitive architecture to acquire and express knowledge about the world and the self. arXiv 2017, arXiv:1706.03661. [Google Scholar] [CrossRef]

15. Pointeau, G.; Dominey, P.F. The role of autobiographical memory in the development of a robot self. Front. Neurorobot. 2017, 11, 27. [Google Scholar] [CrossRef]

16. Reggia, J.A.; Katz, G.; Huang, D.W. What are the computational correlates of consciousness? Biol. Inspired Cogn. Archit. 2016, 17, 101–113. [Google Scholar] [CrossRef]

17. Levy, D. Intimate Relationships with Artificial Partners. Ph.D. Thesis, Maastricht University, Maastricht, The Netherlands, 2007. [Google Scholar]

18. Sullins, J.P. Robots, love, and sex: The ethics of building a love machine. IEEE Trans. Affect. Comput. 2012, 3, 398–409. [Google Scholar] [CrossRef]

19. Fong, T.; Nourbakhsh, I.; Dautenhahn, K. A survey of socially interactive robots. Robot. Auton. Syst. 2003, 42, 143–166. [Google Scholar] [CrossRef]

20. Dunne, D. Meet Silicon Samantha: AI Sex Robot Has a Functioning G-Spot and Can Switch Between 'Family' and 'Sexy' Mode. 2017. Available online: https://www.dailymail.co.uk/sciencetech/article-4331408/Sex-robot-Silicon-Samantha-functioning-G-spot.html (accessed on 29 September 2020).

21. Available online: https://ethicsinaction.ieee.org/ (accessed on 30 December 2020).

22. Ángel, I.T.; Casado, C.M. Simulaciones sexo genéricas, bebés reborn y muñecas eróticas hiperrealistas. Opción Rev. Cienc. Hum. Soc. 2016, 81, 189–212, ISSN 1012-1587. [Google Scholar]

23. Green, R.D.; MacDorman, K.F.; Ho, C.C.; Vasudevan, S. Sensitivity to the proportions of faces that vary in human likeness. Comput. Hum. Behav. 2008, 24, 2456–2474. [Google Scholar] [CrossRef]

24. Hou, J.; Ye, Z. Sex Differences in Facial and Vocal Attractiveness Among College Students in China. Front. Psychol. 2019, 10, 1166. [Google Scholar] [CrossRef]

25. Mariano Gomes, L.; Wu, R. User Evaluation of the Neurodildo: A Mind-Controlled Sex Toy for People with Disabilities and an Exploration of Its Applications to Sex Robots. Robotics 2018, 7, 46. [Google Scholar] [CrossRef]

26. McArthur, N.; Twist, M.L. The rise of digisexuality: Therapeutic challenges and possibilities. Sex. Relatsh. Ther. 2017, 32, 334–344. [Google Scholar] [CrossRef]

27. Burr-Miller, A.; Aoki, E. Becoming (Hetero) Sexual? The Hetero-Spectacle of Idollators and their Real Dolls. Sex. Cult. 2013, 17, 384–400. [Google Scholar] [CrossRef]

28. Middleweek, B. Male homosocial bonds and perceptions of human–robot relationships in an online sex doll forum. Sexualities 2020. [Google Scholar] [CrossRef]

29. James, K.B. 2040 Brad Armstrong, 2009. Porn Stud. 2017, 4, 353–360. [Google Scholar] [CrossRef]

30. Harper, C.A.; Lievesley, R. Sex Doll Ownership: An Agenda for Research. Curr. Psychiatry Rep. 2020, 22, 1–8. [Google Scholar] [CrossRef]

31. Eichenberg, C.; Khamis, M.; Hübner, L. The attitudes of therapists and physicians on the use of sex robots in sexual therapy: Online survey and interview study. J. Med. Int. Res. 2019, 21, e13853. [Google Scholar] [CrossRef]

32. Su, N.M.; Lazar, A.; Bardzell, J.; Bardzell, S. Of dolls and men: Anticipating sexual intimacy with robots. ACM Trans. Comput. Hum. Interact. (TOCHI) 2019, 26, 1–35. [Google Scholar] [CrossRef]

33. Langcaster-James, M.; Bentley, G.R. Beyond the Sex Doll: Post-Human Companionship and the Rise of the Allodoll. Robotics 2018, 7, 62. [Google Scholar] [CrossRef]

34. Döring, N.; Poeschl, S. Love and sex with robots: A content analysis of media representations. Int. J. Soc. Robot. 2019, 11, 665–677. [Google Scholar] [CrossRef]

35. Rousi, R. Me, My Bot and His Other (Robot) Woman? Keeping Your Robot Satisfied in the Age of Artificial Emotion. Robotics 2018, 7, 44. [Google Scholar] [CrossRef]

36. Ess, C.M. What's love got to do with it? Robots, sexuality, and the arts of being human. In Social Robots; Routledge: London, UK, 2017; pp. 57–79. [Google Scholar] [CrossRef]

37. Tay, B.T.; Low, S.C.; Ko, K.H.; Park, T. Types of humor that robots can play. Comput. Hum. Behav. 2016, 60, 19–28. [Google Scholar] [CrossRef]

38. Nordmo, M.; Næss, J.Ø.; Husøy, M.F.; Arnestad, M.N. Friends, lovers or nothing: Men and women differ in their perceptions of sex robots and platonic love robots. Front. Psychol. 2020, 11, 355. [Google Scholar] [CrossRef] [PubMed]

39. Brahnam, S.; De Angeli, A. Gender affordances of conversational agents. Interact. Comput. 2012, 24, 139–153. [Google Scholar] [CrossRef]

40. Chatterjee, B.B. Child sex dolls and robots: Challenging the boundaries of the child protection framework. International Review of Law. Comput. Technol. 2020, 34, 22–43. [Google Scholar] [CrossRef]

41. Döring, N.; Pöschl, S. Sex toys, sex dolls, sex robots: Our under-researched bed-fellows. Sexologies 2018, 27, e51–e55. [Google Scholar] [CrossRef]

42. Danaher, J. Regulating Child Sex Robots: Restriction or Experimentation? Med. Law Rev. 2019, 27, 553–575. [Google Scholar] [CrossRef]

43. Brown, R.; Shelling, J. Exploring the implications of child sex dolls. Trends Issues Crime Crim. Justice 2019, 570, 1–13. [Google Scholar]

44. Headleand, C.J.; Teahan, W.J.; ap Cenydd, L. Sexbots: A case for artificial ethical agents. Connect. Sci. 2020, 32, 204–221. [Google Scholar] [CrossRef]

45. Frank, L.; Nyholm, S. Robot sex and consent: Is consent to sex between a robot and a human conceivable, possible, and desirable? Artif. Intell. Law 2017, 25, 305–323. [Google Scholar] [CrossRef]

46. Fiske, A.; Henningsen, P.; Buyx, A. Your robot therapist will see you now: Ethical implications of embodied artificial intelligence in psychiatry, psychology, and psychotherapy. J. Med. Int. Res. 2019, 21, e13216. [Google Scholar] [CrossRef] [PubMed]

47. Whitby, B. Sometimes it's hard to be a robot: A call for action on the ethics of abusing artificial agents. Interact. Comput. 2008, 20, 326–333. [Google Scholar] [CrossRef]

48. Connor, S. Guys and Dolls. Women Cult. Rev. 2015, 26, 129–142. [Google Scholar] [CrossRef]

49. Yulianto, B. Philosophy of information technology: Sex robot and its ethical issues. In Rapid Autom: Concepts, Methodologies, Tools, and Applications; IGI Global: Pennsylvania, PA, USA, 2019; pp. 1458–1467. [Google Scholar] [CrossRef]