Robots, Ethics, and Intimacy: The Need for Scientific Research

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Abstract

Intimate relationships between robots and human beings may begin to form in the near future. Market forces, customer demand, and other factors may drive the creation of various forms of robots to which humans may form strong emotional attachments. Yet prior to the technology becoming fully actualized, numerous ethical, legal, and social issues must be addressed. This could be accomplished in part by establishing a rigorous scientific research agenda in the realm of intimate robotics, the aim of which would be to explore what effects the technology may have on users and on society more generally. Our goal is not to resolve whether the development of intimate robots is ethically appropriate. Rather, we contend that if such robots are going to be designed, then an obligation emerges to prevent harm that the technology could cause.

Introduction

Ethical concerns about robotic technology have garnered much attention, especially in the context of how it may be used for military engagements. Understandably, there is much trepidation about whether, and in which circumstances, robots should be used in war. Although perhaps not as ethically weighty as their use in the military context, an emerging and significant area of concern is how robotic technology could affect the well-being of humans during the course of their daily lives. More specifically, intimate relationships will begin to form in the near future between robots and human beings. It is the sort of development that should not be treated lightly; it certainly deserves thorough ethical scrutiny. The advent of situated, embodied, and responsive robotic technology can have a profound impact on the social fabric of communities if and when people start to truly care about and form loving attachments to robotic artifacts. What may mitigate some of the concern about intimate robotics is ensuring that the realm is informed by rigorous scientific research, which systematically examines the associated ethical, legal, and social issues. Correspondingly, this paper will focus on two key aspects of intimate robotics. First, we will seek to identify key ethical concerns associated with this technological realm. Second, we will articulate some of the main research questions that need to be addressed prior to intimate robotics becoming a reality.

Defining Intimacy

Intimacy can be difficult to define precisely, but it undeniably encompasses thoughts and behaviors beyond those merely involving physical sex acts. In many circumstances, it refers to interactions that do not have a sexual dimension. The implication is that if a relationship is intimate, it contains a facet of strong emotional attachment or even love. Although "love" is a notoriously difficult to define term, many authors shed light on that term may mean by categorizing its different types (e.g., Sullins 2012, 401; Sternberg 1986). For our purposes, we operate with the assumption that love, in a broad and encompassing sense of the term, is an essential component of intimate relationships.

Technological artifacts can play a key role in the formation of intimate relationships between human beings. Within that context, intimacy can be encompass (Bell et al. 2003):

- Cognitive and emotional closeness with technology, where the technology may be aware of and responsive to our intentions, actions, and feelings.
- Physical closeness with technology, either on or within the body.
- The use of technology to express our intentions, emotions, and feelings towards others.

In some ways, it is natural for human to form affective bonds with animate and inanimate non-human entities. Young children, for example, seem rather predisposed to form strong attachments to items such as blankets and toys. And certainly both children and adults form emotional bonds with their pets (Levy 2007, 46-63). More specifically related to technological devices, Reeves and Nass state (1996):

> Equating mediated and real life is neither rare nor unreasonable. It is very common, it is easy to foster, it does not depend on fancy media equipment, and thinking will not make it go away. … Media equal[s] real life applies to everyone, it applies often, and it is highly consequential. And this is surprising.

Commonly expressed predictions about the near future suggest that the design of robots will progress in such a way that the technology will effectively be able to establish intimate relationships with a broad range of human beings. Of course, users have already bonded with robots to some degree (for example, children developing feelings of affection for *Paro* or *Keepon*). But the intensity and scale of these attachments are expected to change dramatically with the increasing sophistication of robots.

Intimate Robotics

Many types of robots are in the process of being developed but the discussion here will largely focus on "human-like" robots designed to serve as companions for people. At least some of these robots may eventually have an intimate relationship with a human being, which could include a sexual component. Fictional robots that display sexual features go back at least to the 1927 movie *Metropolis* (Perkowitz 2004, 27-29). In 2007, Levy examined the technological state of the art in sexual robotics. He and other scholars describe scenarios where humans might seek out a robot in order to satisfy their physical desires. However, intimate robotics is fundamentally different as it does not simply include physical sex, which up until now has been the realm of science fiction (e.g., Blade Runner, Cherry 2000, AI, Asimov's Robots of Dawn, Battlestar Galactica, Data from Star Trek: The Next Generation, etc.). Robots could be designed in ways that move beyond being just involved in sex acts and yet are still considered intimate in a broad sense of the term.

Sullins (2012, 298) is correct that the robotics community is not yet near creating an android that is indistinguishable from a human; yet that is not a strict requirement for a human being to have intimate feelings for a robot. What makes robots unique in terms of the types of intimate relationships they may be able to form with a human is the sophistication of the traits they can possess. Physical robots can display behaviors capable of inducing feelings of attachment from human users (Bowlby 1979). This can be accomplished through a variety of methods, including affective modeling (Moshkina et al. 2011), behavior generation (Arkin et al. 2003), kinesics, haptics, and proxemics (Brooks and Arkin 2007), which may yield significant unidirectional affective bond formation between a human and the robot. As opposed to the visual and auditory experiences that computing devices can already provide, a physical robot could in addition hold someone's hand or pat one's shoulder. Or it could provide emotional support through a hug or verbal discourse. Furthermore, some roboticists (e.g., Samani et al. 2011) are specifically examining the design features of a robot that may lead to the formation of mutual love between it and a human.

The embodiment of robots raises the stakes with respect to love and intimacy as opposed to merely sexual objects. This is a key part of the reason why ethical and social issues related to robots are more complex, and perhaps more troubling, than those associated with sex machines or toys. The feeling of intimacy and bonding with a robot as a result of persistence and embodiment, and not just physical sex,

can become a likely reality. Human users could certainly believe as though they are in an intimate relationship with a robot without the robot genuinely reciprocating the feelings directed towards it.

Effects on the User

While the justification for the development of innovative technology, including robotics, is often couched in the language of liberty maximization, scholars have warned about the potential deleterious effects of the bonding that can form as a result of human-robot interaction (HRI) (e.g., Scheutz 2011); the ethical ramifications of these bonds have been explored in some depth (e.g., Sparrow 2002). Similar issues can also emerge within the context of elder and child care if a relationship of trust is established (Sharkey and Sharkey 2010; Borenstein and Pearson 2010).

As alluded to above, intimate robotics is fundamentally different from sex toys and devices which have been with human beings for millennia. The risks that a robot may uniquely pose are related to its embodiment (as different from pornographic videos or games), situatedness (being collocated with the human partner contextually), affective attachment, and responsiveness (as different from sexual paraphernalia). User expectations for a robot will be molded by the technology's similarities in appearance and behavior to a human. The bonding between a robot and a human partner may lead to unprecedented changes in society that are difficult to foresee although some scholars have sought to articulate the associated risks (Sparrow 2002).

Among the key ethical issues that warrant examination from the perspective of how the user might be affected include whether, and in which ways, intimate robotics may uphold or erode autonomy. The case could arguably be made that the technology supports autonomous decision making by allowing the user to select from a range of relationships options. Those who have difficulty forming social bonds, perhaps in some cases due to bad experiences, shyness, or a disability, might prefer to interact with technology. The existence of a companion robot could be viewed as offering the user as an alternative to what may be perceived as difficult or emotionally taxing situations.

However, a common concern, often discussed in the context of healthcare, is whether introducing robots into a user's life might constitute a form of deception (Sparrow and Sparrow 2006); the user may project traits or characteristics onto the technology that it does not possess (e.g., the robot "cares" about me or is "happy" to see me) (Borenstein and Pearson 2013, 184-186). There are even reports of U.S. military personnel forming attachments with bomb disposal robots (Michel 2013). Humans certainly have a psychological predilection for anthropomorphizing pets and other entities, which can lead to the formation of a powerful emotional bond (Levy 2007). At times, generating this type of user response is what a roboticist deliberately intended; it may have resulted from a series of calculated design decisions (Arkin et al. 2012). As Sullins notes, given the roboticist's ability to design technology that elicits strong emotional responses from a user, it may follow that human-robot relationships can be established which are "as real and moving as those we have with our beloved pets and insincere lovers" (2012, 399). While we do not need to be committed to a point of view on whether a robot will be able to genuinely love a human being, a user could plausibly "fall in love" with a robot. Some users seem to already have feelings of love, at least in some sense of the term, for technological artifacts (Levy 2007).

The user may experience a range of psychological effects while interacting with an intimate robot, some of which may be rather difficult to predict. For example, how might a "risk-free" relationship with a robot affect the mental and social development of a user? Presumably, a robot would not be programmed to break up with a human companion; and thus, theoretically, this would result in the removal of the emotional highs and lows from the relationship. A similar concern has been articulated in

the context of the formation of connections online where some individuals may call each other "friends" but have never had met one another (Dreyfus 2004, 77-78). For example, they may have temporary interactions, such as playing online games together, but not necessarily have to navigate through the full range of challenges that can be associated with friendship. Yet what has been learned from empirical studies of online friendships will not necessarily map directly onto what may occur in the context of HRI. The lack of an ability for the robot to rebuff the human user may, for example, lead to a behavioral deviation from the human norm that may push the user into the uncanny valley (Mori 2012) where the artifact becomes substantially less satisfying and realistic; this could at a minimum disrupt the illusion of willing participation.

Altering Human-Human Interaction

As Turkle states, "A relationship with a computer can influence people's conception of themselves, their jobs, their relationships with other people, and with their ways of thinking about social processes" (1984, 168). Intimate human-robot partnerships may have a similar impact on human-human relationships and on society more broadly. Associated concerns include the effects intimate robotics may have with respect to the stability of marital, pre-marital, and courtship relationships. For instance, feelings of jealousy may emerge from the amount of time that a significant other spends with a robot. On the other hand, the technology could be used to enhance the intimacy that couples experience with one another. The loss of contact with fellow humans and perhaps the withdrawal from normal everyday relationships is also a possibility. For example, a user who has a companion robot may be reluctant to go to events (e.g., a wedding) where the typical social convention is to attend as a couple.

Moreover, intense stigmatization may occur in response to intimate human-robot relationships; it is not outlandish to predict that humans in these relationships might fear for their safety given how human society often persecutes those who are perceived to be "abnormal"; at least some religious perspectives are likely to consider a robot-human relationship to be "sinful" and perhaps something that warrants punishment.

Even changes in the workforce in terms of new job creation and the effect on human performance at their existing jobs would not be unexpected should some form of addiction to these artifacts manifest itself. Given the potential for companion robots to alter the nature of human-human relationships and even the definition of love, we suggest that this realm warrants more extensive research and, to echo Whitby's sentiment (2012, 243), greater public scrutiny.

The Status of Intimate Robotics as a Research Field

Social and companion robotics is currently a highly active research field, with numerous conferences on the subject. Rarely, however, is the subject of intimate HRI broached in serious scholarly venues; this is largely because the realm is still considered taboo. There are some attempts to rectify this, notably the series of conferences on Love and Sex with Robots.[1] Nonetheless, robotic artifacts that are more or less sexual devices are being developed and marketed in a technically unsophisticated manner. Sex and pornography played a large role in the development of video recording devices and the Internet, and robotics is probably not immune from that type of influence.[2] Moreover, the realm of intimate robotics, as mentioned previously, is not just about sexual devices; it is about a broad category of technology with which human users might form strong emotional attachments.

Drawing from Sternberg's Triangular Theory of Love (1986), it is worth investigating whether the three key components of love (intimacy, passion, and commitment) will form between humans and robots. The empirical findings from psychologists and others about the courtship behaviors that facilitate

bonding (e.g., Renninger et al. 2004; Grammer 1989) will likely influence roboticists as they design intimate robots. This type of strategic effort could significantly affect, and potentially harm, users in numerous ways.

Establishing a Research Agenda

An argument in the engineering world that often emerges with regard to the development of an ethically contentious technology (including weapon systems) is that if the technology is not created by "us", then someone else will inevitably do so. While it may be ethically dubious to create atomic weapons, for example, the refusal to pursue their development may put a nation at a serious disadvantage. This is hardly to say that the point of view is necessarily correct; there are many critics of this type of argument in part because it may be used as a strategy to try to morally insulate designers from blame or accountability for the technology that they create. A similar type of argument, and resulting counterarguments, can be voiced with regard to intimate robots. We will not seek to resolve the dispute here about whether creating the technology is ethically acceptable. However, consumer demand and market forces will likely drive the development of intimate robots, and if this is the case and the effects of the technology are not rigorously studied, there will be much potential for users and others to experience profound harm.

If we operate with the assumption that intimate robot-human relationships are going to become reality, then an ethical imperative to develop a comprehensive scientific research agenda emerges, which seeks answers to questions that could prevent harm to users and others. Of course, there is the overarching issue of whether certain types of research questions in this realm are unethical or otherwise inappropriate to explore but that is not something we seek to resolve here. Rather, our purpose is to identify key research questions that should be addressed prior to allowing intimate robots to become pervasive.

Among the research questions that warrant exploration include:

- Which kinds of beliefs and attitudes about intimate robots are likely to emerge from users who interact with the technology?

Users may view these robots as just another form of technological artifact (like how a computer is standardly perceived) or alternatively more meaningful emotional attachments might form. Turkle notes that children tend to think toys that move are "alive" (2006, 8); furthermore, children seem to grieve when electronic devices like the Tamagotchi "die" (2011, 33-34 & 42-44). Is this psychological reaction likely to carry over to adults if and when robots appear to behave in more sophisticated ways? Based on the interactions humans have with non-human entities, Levy (2007) makes a compelling case that people will likely form strong emotional attachments to robots and even fall in love with them. Users will likely draw on past experience with other humans as a reference point for forming expectations about how a robot might behave (Feil-Seifer and Mataric 2011, 27) and perhaps for how the robot "feels" about them.

- How might intimate robots contribute to, or fail to contribute to, the well-being of users?

If users sincerely believe that they are in a loving relationship with a robot, will they experience benefits that are similar to being part of a human couple? Humans have various emotional and other needs that drive them to seek out companionship; these needs include self-esteem, having a sense of affiliation, and self-actualization (Sternberg 1986, 122). Humans already trust, and arguably overtrust (Carr 2014),

many electronic devices including computers, GPS, and smart phones. However, as compared to other devices, a user's identity and well-being may be more integrally tied an intimate robot; the technology can pose rather unique risks to a user if emotional attachment and feelings of love emerge.

- Would the use of technology change beliefs, attitudes, and/or values related to human-human relationships and if so, how?

As mentioned previously, concern persists about whether the technology might disrupt human relationships such as marriages (e.g., a scenario displayed in the fictional TV show *Humans*). It is an open question whether users may become less tolerant of human idiosyncrasies and failings; perhaps some will become impatient and become unwilling to put the effort into working on human-human relationships. Moreover, some humans seek out prostitutes or other non-traditional arrangements due to the "lack of complications" (Levy 2007, 210); presumably, this could carry over to individuals who prefer a relationship with a robot and avoid the challenges associated with intimacy formation between human beings.

Another facet of the topic is if one's significant other has an intimate interaction with a robot, does this constitute a form of cheating? For example, some couples may live in different cities from one another and perhaps will desire the companionship of a robot while the other person is away. Given that there are different perceptions on whether "cyberromance" should be characterized as being unfaithful (Levy 2007, 45), it is safe to assume that couples will disagree on this matter.

- Are there different cultural or religious perceptions of what is appropriate practice in this realm, and if so, what might that mean in terms of societal acceptance or rejection of the technology?

Generalizations are widespread about how different cultures perceive robotic technology (e.g., that Japanese people are technophiles and that American society has deep-seated fears about robots (Kaplan 2004)). Indeed, robots have already served as officiants in Japanese wedding ceremonies (I-Fairy Robot 2010) and have even been married to each other (McCormack 2015). Perkowitz notes that Japanese religions are often seen by scholars as not drawing a sharp distinction between animate and non-animate beings, while "Western religion is hostile to artificial beings, the creation of which is seen as impious or worse" (2004, 215-216). In fact, some efforts are forming to ban the practice of robot prostitution (Brown 2015). Investigating the alleged differences in cultural and religious perceptions of intimate robots could be an important facet of a larger research endeavor.

- Is there a (causal) connection between interacting with an intimate robot and an increase or decrease in violent behavior by the user of the technology?

For many reasons, this would be a difficult research question to resolve but it is crucial to unearth any relevant data. With regard to debates about the morality of pornography, there are views all along the spectrum on the effects it may have on viewers. On one end of the spectrum, some argue that it may be an outlet for sexual desire and thus reduces the likelihood of violence; on the other end of the spectrum, one might contend that it distorts perceptions about the value of a human being and may intensify the desire to harm others. Similarly, the causative and/or correlative connections between interacting with an intimate robot and the effect on user behavior would need to be investigated. For example, if a user repeatedly kicks a companion robot, one could ask whether there is anything unethical about such acts. Kate Darling at MIT has investigated this to some degree but in the context of "torturing" a robot (Lalji 2015; Daily Mail Reporter 2013). Yet what is likely to be of greater concern,

however, is whether this would establish a pattern of behavior that may eventually affect other humans. If a robot's sensors are not advanced enough to distinguish between a tap and a malicious kick, it could reinforce bad behavior by the user. In short, would the normalization of consequence-free violence in the user's personal life eventually affect other people?

- Could an intimate robot serve a therapeutic purpose for certain kinds of medical or sociopathic conditions?

One could imagine that a person who was a victim of a traumatic event (such as a physical assault) would naturally have difficulty trusting other people. Arguably, a robot who befriends a traumatized person might be viewed as a soothing intervention. On the other hand, some might interpret the strategy as being highly insulting and insensitive. On a different note, Levy suggests that robots may be useful for those "who suffer from psychosexual hang-ups" (2007, 308); a fictional example similar to this is displayed in the 2007 movie *Lars and the Real Girl* where the main character has a romantic relationship with a doll.[3] Another possible goal for researchers is to identify interventions involving robotic technology that could reduce rates of recidivism among those who commit sex crimes.

Conclusion

A vast array of intimate robots is seemingly on the horizon. If roboticists intend to continue pursuing this design pathway, the technology that they build could significantly impact the well-being of users and the stability of human-human relationships. Given this state of affairs, it entails an ethical obligation to systematically investigate the likely effects that the technology may have on society. Although many may consider this realm of inquiry taboo, the overarching aim of preventing harm to users and their communities is one worthy of pursuit and actually may invoke a moral imperative to do so.

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[1] Refer to http://loveandsexwithrobots.org/ (accessed September 14, 2015).
[2] Don Norman, personal communication with one of the co-authors
[3] Refer to http://www.imdb.com/title/tt0805564/ (accessed September 21, 2015).