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Dry your eyes

Examining the roles of robots for childcare applications

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1. Introduction

In their article, Sharkey & Sharkey (2010) present an ethical appraisal which argues that using robots as replacement for childcare applications could lead to neglect on the part of the parents and attachment disorders on the part of the children. They combine current commercial robot marketing trends with educated extrapolation to describe how childcare robots of the present and future could lead to misunderstanding and thus misuse of technology. Specifically, parents could believe that robots are capable caregivers, and therefore abdicate too much parenting responsibility to machines. In addition, children could believe that robots are reliable social role models and therefore abdicate judgment and emulate incorrect/inappropriate behavior. This scenario, while frightening, is based on some incorrect assumptions regarding both human perception of social robots and the intended role of socially assistive robot technology (Feil-Seifer & Matarić, 2005).

This critique will not attempt to argue for or against using robots in childcare, but rather present an alternative appraisal grounded in the current state of socially assistive robotics research. In this way, we will refute the Sharkey & Sharkey argument and present a counter-argument that demonstrates that current research in socially assistive robotics is leading away from scenarios where a robot is the sole caregiver of a child.

We believe that raising ethical concerns about technology is important and valuable. However, such concerns must be based on realistic trends and probabilities, so that their outcomes lead to important and relevant issues in childcare, and do not instead distract from those very issues.

2. Sharkey argument

The crux of the Sharkey & Sharkey argument is that the use of robots in childcare could lead to social neglect of the child. This neglect can come in several forms: the

parents could be convinced that the child is receiving adequate care when the robot is not able to provide that care; the child could be lead to think that the robot is providing normal social interaction when it is not; and manufacturers of a robot could exaggerate the robot's capabilities so that the users believe that it is able to adequately care for the child. We aim to clarify the low likelihood of these scenarios.

2.1 Delusion of social competence

The authors assert that the expressive capabilities of current robots, and therefore those of robots in the foreseeable future, give the appearance of social competence. With regards to childcare applications, this includes the abilities to recognize speech, make eye contact, and make purposeful movements, and that these expressive capabilities can deceive users into thinking that the robot is more capable than it is, because robots do and will continue to lack critical elements of *understanding* social behavior, such as natural language processing (NLP), activity recognition, etc.

The argument made by the authors is partially correct. However, while there are specialized areas of human-machine interaction where strides have been made in NLP, activity recognition, etc., these are currently narrow and repetitive. For unrestricted childcare domains and applications, such abilities are not within reach in the foreseeable future.

The authors also present evidence that current robot manufacturers are advertising robots as childcare solutions. These robots, as alluded to above, are probably not well suited to being the only supervision of a child. This presents the probability that robot vendors could/are exaggerating the capabilities of a robot in potentially irresponsible ways.

These points, while troubling if true, are not well supported by the state-of-the-art in relevant research. Our work and that of others that is exploring using social robots as therapeutic tools for children with autism spectrum disorders (ASD) found that the best robots of today are not capable of interacting convincingly with young children in unconstrained, free-play scenarios (Feil-Seifer et al., 2009). We used a humanoid robot that could turn its head and body to face a child, follow it around the room, and make social gestures in response to the actions and vocalizations of the child, most of the criteria named by Sharkey & Sharkey as what would be convincing to young children. However, we found that the children in the study (aged 5–10) quickly determined that the robot was not as socially intelligent as a human being. One even remarked, matter-of-factly, that he thought that the robot was learning disabled. This suggests that children, both those with social disorders and typically developing ones, are able to discern a robot's real social capabilities, and are not easily fooled or fooled for very long. These findings

are also supported by other works (Robins et al., 2005; Plaisant et al., 2000; Kanda et al., 2004).

The delusion of social competence relies on the user observing social behavior appropriate for the current social situation in order for the delusion to be sustained. While some robots can briefly carry on an appropriate and engaging social interaction, no robots as yet can carry on a meaningful and unrestricted social interaction convincingly enough for a human (adult or child) to be deceived into thinking that the robot is socially competent. For such a misconception to occur, the robot would need to be much more capable than the authors suggest or that the state-of-the-art makes possible.

2.2 Lack of attention and attachment disorders

Sharkey & Sharkey further assert that the lack of proper attention on the part of the robot (or, more accurately, by the parents) could lead to attachment disorders. They present a review of psychological literature that shows how the lack of certain nurturing social attention can lead to various relationship issues, and how such damage can occur any time during the development process. We are not psychologists and cannot comment on the likelihood of attachment disorders, but we agree that a lack of nurturing social interaction can lead to developmental issues. However, we do not feel that the current state of childcare robots will lead to such conditions where they would not exist otherwise.

Attachment disorders directly resulting from robot involvement in childcare could be caused by two scenarios:

1. The child is placed in the care of a robot for too long because the parents, through inattention toward the robot's care of the child, are unaware of the robot's inability to care for the child; or
2. The child is placed in the care of a robot for too long because the parents have been incorrectly led to believe that the robot is able to care for the child.

In the first scenario, the parent believes that the robot can care for the child when in fact it cannot. This would lead to neglect of the child when the child is placed in the robot's care. As discussed above, parents and even children are able to quickly determine the social ability of the robot after a few minutes observing the robot interacting with a user (more importantly any lack thereof). If the parent does not notice this, or if the parent ignores this fact and leaves the child in the robot's care anyway, then that would constitute neglect as much as if the parent left the child under the supervision of other insufficient surrogate care, such as a television, video game, or an unqualified human caretaker. This is not a neglect situation that is specific to a robot.

In the second scenario, the robot's manufacturer misleads the parent to believe that the robot can care for the child when in fact it cannot. The potential for neglect is the same as above, but the responsibility for that neglect would be shared between the manufacturer and the parent.

Assuming that the social delusion created by the robot can be dispelled quickly by observing the robot in social situations, a parent need only give a childcare robot the same evaluation that one would give a new caregiver or babysitter in order to correctly determine what the robot is capable of. Again, this is not a situation that is unique to robot caregivers.

Thus, it is important to note that the conditions that could cause neglect based on inadequate supervision are the result of factors not directly linked to childcare robots, but rather by the neglect of the parents, or by negligent advertisement of childcare services. The use of any technology, including television, video games, and computers, with children is a decision that each family makes for itself, after careful consideration and deliberation, and only when accompanied by vigilant monitoring for any misuse.

3. Counter argument

We contend that socially assistive robots, (Feil-Seifer & Matarić, 2005), namely robots that provide assistance through social interaction, are not being studied or designed to be replacements for human beings in caregiving roles, but as an augmentation of care that is already in place (Feil-Seifer & Matarić, 2005).

The field of assistive robotics in general, and socially assistive robotics in particular, is very young and as such is subject to rapid evolution. The goal of the field has been to develop intelligent systems capable of providing assistance by enhancing existing care. For example, *Paro*, a robotic seal studied in eldercare situations (Wada et al., 2003) was used in the common areas of nursing homes. The robot was designed to be an interesting social entity. Researchers observed that the residents spent more time in the common areas when the robot was present, increasing the amount of time spent interacting with other people compared to time spent in their rooms. Similar examples include robots used in common areas of elementary schools (Kanda et al., 2003) and those used for children with ASD (Kozima et al., 2007).

The key element of all of these studies was that the robot was used not to replace human care and social interaction, but rather to supplement and enhance such care and interaction. As the field of socially assistive robotics develops, benchmarks and performance metrics for evaluating the robot system are being proposed that would take into account how any human-robot interaction affects

the human–human interaction the was occurring naturally (Feil-Seifer et al., 2007; Tsui et al., 2008).

In summary, active research into human–robot interaction for assistive applications is aimed at using robots to encourage, not stifle, human–human interaction. It is important for ethical appraisals to be conducted frequently to verify that this philosophy, which now dominates the field, is not replaced by a less healthy scenario, such as that presented by Sharkey & Sharkey.

4. Conclusions

There are many valid reasons to be concerned about how childcare robotics could lead to neglect on the part of parents. However, we believe that the ethical dilemma posed by Sharkey & Sharkey is not well grounded in the majority of socially assistive robotics research, and that the concerns raised by the authors regarding the potential for neglect caused by childcare robots are not particular to robots, but apply to any technological or other childcare surrogate. In summary, as childcare robots move closer to becoming a reality, parents, roboticists, and legislators should remain vigilant about ethical issues, but take care to separate what undesirable human (including parent, marketers, etc.) behavior may be *facilitated* by robotics technology from what may be *caused* by robotics, and for that matter any other technology in our daily lives.

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