Extended Abstract: A Case Study in Caregiver Overtrust of Pediatric Healthcare Robots

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I. Extended Abstract

Robots are being introduced into the U.S. healthcare system with growing frequency [1]. From surgical robotic systems to medication delivery devices, medical services are being transformed through the integration of diverse intelligent agents and platforms. Robotic rehabilitative devices are also gaining traction, including those for use with pediatric populations. The primary intent of such robots is to improve the quality of life for children. Yet a key ethical concern with the intended utilization of robots in pediatric healthcare settings is the prospect that children, their parents, and other caregivers might begin to overtrust the technology. This concern stems from studies indicating that placing too much trust in automated healthcare systems may result in unintended negative consequences. For example, when physicians overtrust automated systems for detecting cancer, it may contribute to certain types of cancers being overlooked [2]. In fact, a systematic review of clinical support systems discusses the potential overreliance on automated healthcare systems and how the occasional incorrect advice derived from these systems may cause expert users to reverse decisions they had already made [3]. In the context of healthcare robotics, overtrust might result in improper usage or premature adoption of the technology; individuals may be granted access before they have had sufficient training or a clear understanding of the technology's capabilities. Based on the growing use of robots for healthcare-related applications, it thus becomes appropriate to explore the implications and potential for overtrust within healthcare settings in the hopes of mitigating or preventing possible negative effects.

To deal with the growing concern that patients, caregivers, and medical professionals may place too much trust in healthcare robots, we conducted an initial study to examine the potential of overtrust as it relates to pediatric robotics. As a first step, this paper discusses results from a survey which examines the perspective of parents who have at least one child with a movement disability. The main goal of the survey is to assess whether, and in which circumstances, parents may place too much trust in the use of healthcare robots with respect to their child. For this study, we focused on the use of robotic exoskeletons (Figure 1) since, of all of the currently available robotic technologies, it is the most viable in terms of being adopted into the home setting as a clinically-validated rehabilitative device for both adults and children.

In the context of robotics, "overtrust" is a term used to describe a situation in which (1) a person accepts risk because it is believed a robot can perform a function that it cannot or (2) the person accepts too much risk because the expectation is that the robot will mitigate the risk [4]. Vulnerable populations, such as children with acquired or developmental disorders, are particularly susceptible to the risks posed by overtrust [5, 6]. Generally speaking, children lack the experience to competently assess the hazards of using complex technological devices [7, 8]. Conjoining this with the observation that children, especially teenagers, are at a rather risk-seeking stage of life, the chance of harm intensifies. As such, children may seek to test the limits of a robotic device's safety features or even actively try to misuse the device.

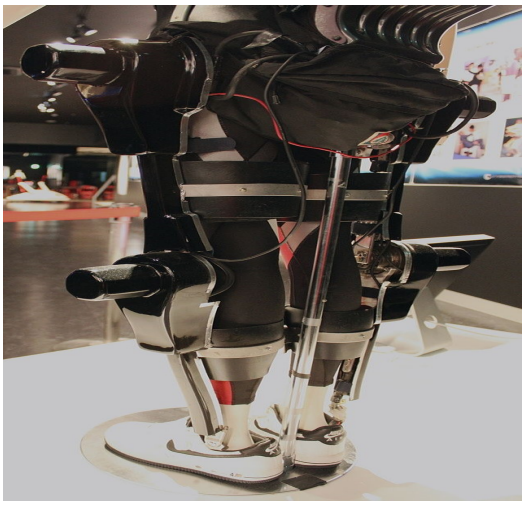

Figure 1 An exoskeleton platform for human mobility enhancement. Exoskeletons enhance the patient's mobility by providing additional battery powered strength to one's joints and by enhancing one's balance. The exoskeleton photograph is by Yuichiro C. Katsumoto from Shonan, Japan-Cyberdyne Studio. Uploaded by Chime, CC BY 2.0, commons.wikimedia.org/w/index.php?curid=9963050.

This poster presents research exploring parent's feelings, attitudes, and beliefs related to their children's potential to overtrust a robotic exoskeleton. We show that, indeed, such overtrust appears to be likely and that the parents, children, and healthcare practitioners should be particularly cautious when using a robotic technology as a treatment. Our results show that, at least in the case of exoskeletons, parents and children may be likely to use the device in ways that place the child at greater risk. Finally, this research highlights the use and importance of overtrust directed research.

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