Robots, Ethics, and the Environment

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ABSTRACT

As robots become more pervasive and take on an ever-growing number of tasks, exploring ethical issues relating to the technology takes on increasing importance. Specifically, the manufacturing and sale of personal service robots could be severely detrimental to the environment. Ideally, members of the robotics community would develop a comprehensive awareness of the complex ethical and environmental consequences emerging from their design pathways before historical patterns are repeated.

Keywords: Engineering Ethics, Environmental Ethics, Planned Obsolescence, Robot Ethics, Sustainable Design

1. ROBOTICS, ETHICS, AND THE ENVIRONMENT

Situated within the realm of technology and ethics are various categories of ethical issues relating to the design and use of robots, including the type of impact that robots will have on the environment. Environmental concerns relating to robots are numerous and complex, far too many to do justice to within one paper. Thus the focus will be narrowed onto two main categories of concerns, ones that historically are not addressed thoroughly enough before a technology comes to market. The first category relates to how robots will escalate the demand for limited natural resources. The second focuses on the disposal and recycling of robots. They appear in many different shapes and sizes, used for both civilian and military purposes, but the discussion here will primarily revolve around personal service robots. The goal is not necessarily to halt the production of these robots. Rather, it is to encourage scientists and engineers to avoid perpetuating practices that are not only destructive to the environment but that raise humanitarian concerns as well. Ideally, a proactive and ethically responsible design strategy for robots will emerge.

2. WHY ROBOTS?

As time passes, the number and type of robots used in industrial and military sectors and in our personal lives is expected to grow rapidly. For example, the U.S. government recently announced the creation of the National Robotics Initiative, a program aimed at facilitating the growth of the technology (Guizzo, 2011). Key incentives for industry include streamlining processes and maximizing profits. The U.S. military has disclosed its goal to automate a
sizeable portion of its forces in part to minimize loss of life (U.S. Department of Defense, 2001). Admittedly, at least some of ethical issues raised herein might not be unique to robotic technology. But drawing attention to the specific design features of personal service robots, as opposed to other technologies, is paramount because the market for them is relatively new and the onset of the robotic age may be nearing. In short, there is an opportunity to address environmental concerns relating to the design of robots before the public fully embraces the technology.

Articulating a sharp distinction between robots and other technologies is difficult to do, but Clarke (1993) identifies properties such as “programmability,” “mechanical capability,” and “flexibility” that help characterize a robot. Moreover, the “sense-think-act” paradigm can be used as guide in terms of what counts as a “robot” (Siegel, 2003). In other words, robots are typically capable of detecting external stimuli, processing that stimuli, and then performing an action based on some sort of decision-making procedure. What makes a robot rather unique as compared to other technologies is that this sequence of events can occur with little or no input from a human user. In other words, robots are typically programmed to perform self-directed actions. Robots often have a physical body and the capacity for motion. They do not necessarily have a humanoid appearance though some of them do (or eventually will).

The present discussion will center on a subset of robotic technology; ones used by the individual consumer. The label might be somewhat imprecise, but for simplicity sake, they will be referred to as “personal service robots.” The potential applications for personal service robots are manifold; some have not been fully envisioned. Unlike industrial robots, robots of this type are supposed to be brought into the home, perhaps to be a “pet” or a “friend” for a child. Other personal service robots can take on tasks such as providing in-home security, housecleaning, or looking after young children and serving as their tutors. Scholars are beginning to address the ethics of allowing robots to take care of nursing home residents since their use in that context seems to be approaching (Sparrow & Sparrow, 2006). Levy (2008) anticipates that robots will become “romantic” companions for human beings.

It is not a foregone conclusion that each type of personal service robot will be successful in the marketplace. Individuals across the globe might not react in the exact same way when confronting a robot. MacDorman et al. (2009) shrewdly identify factors such as cultural context and religious beliefs that can influence how robots are perceived and whether they will be embraced. For example, they note that the depiction of robots as heroes in Japanese science-fiction might contribute to the widespread acceptance of the technology in Japan. Sofge (2010) observes that in American science-fiction, there is typically a close connection between the creation of robots and the emergence of a bleak future. Yet it is debatable whether this truly reflects Americans’ feelings about robots. Clarke (1994) points out that the aesthetics of a robot and the manner in which it interacts with a user are crucial elements. For example, if a robot’s appearance elicits an unpleasant reaction because it looks “too human,” typically referred to as the uncanny valley hypothesis, its rejection may follow. In short, the magnitude of impact that personal service robots will have on a society, and on the natural environment, is contingent on whether the public accepts the technology and to what degree.

New technologies, such as the mobile phone, often make a transition from being a “novelty” to a “convenience” to a “necessity.” It is too early to know whether personal service robots will follow a similar pattern. They are probably still a “novelty.” But the public’s interest in them seems to be gaining traction. Guizzo (2010) estimates that there are roughly 8.6 million robots in the world. According to Sharkey (2008), “sales of professional and personal service robots have risen sharply and are estimated to total ~5.5 million in 2008.” Further, the South Korean Ministry of Information and Communication claims that each home in its...
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