

Roboethics as a Research Puzzle

Karolina Zawieska
Centre for Computing and Social Responsibility
De Montfort University
Leicester, United Kingdom
karolina.zawieska@dmu.ac.uk

Ben Vermuelen
Department of Economics
University of Hohenheim
Stuttgart, Germany
b.vermeulen@uni-hohenheim.de

Abstract—This position paper discusses the question of incorporating roboethics into the roboticists’ thinking about their research. On the one hand, there has been a growing recognition of the need to develop and advance the field of roboethics. On the other hand, for different reasons, a large part of the robotics community has still been reluctant to explicitly address ethical considerations in robotics research. We argue here that in order to facilitate and foster ethical reflection in roboticists’ work, roboethics should be seen as a research puzzle. This implies studying rather than only applying specific ethical principles, as well as taking highly creative and pioneering approaches towards emerging ethical challenges.

Keywords—*roboethics; ethics; roboticists*

I. INTRODUCTION

As robots evolve and gradually enter everyday life, a new type of both ethical and social concerns also emerges. The two go hand in hand and are central to human-robot interactions and understanding of the overall role of robots in our society. While there has been a growing agreement on the need to pursue roboethics research that would address and guide ethical robot design, how to incorporate ethical reflection into roboticists’ work often remains unclear. We argue here that in addition to addressing roboethics through formal education, it requires taking a specific approach and proactive attitude in every day work. We propose that ethics can be approached as a puzzle and a research subject that is not too distant from the roboticists’ thinking about other parts of their work.

II. OPEN QUESTION

While certain ethical principles and values may seem universal, it is important to remember that they may also evolve over time (the concept of good and evil has sometimes been literally studied from the evolutionary psychology perspective [7]). Therefore, a development of ethics in general and roboethics in particular is a process of the continuous reflection and negotiation. This is particularly true for new domains such as robotics, that often bring ethical challenges never seen before (“what was once fiction is becoming fact” [6]). In this sense, ethics in robotics constitutes an open question and the subject that requires systematic study supported by empirical findings that may challenge the previous ethical notions as well. No single discipline or individual can provide ultimate answers for what is good and bad, and hence, there is clearly the need for interdisciplinary efforts, with the key contribution from

roboticists. How to pursue such an approach in practice is yet to be determined.

III. INGENUITY CHALLENGE

In principle, robotics research often involves pioneering thinking about robotic systems and robot applications. Ethical reflection can also be seen as matter of anticipating and shaping different phenomena that are yet to materialise, in particular in the Human-Robot Interaction (HRI) domain (it is the involvement of the human being rather of the robotic system alone that leads to ethical challenges). The international debate on autonomous weapon systems (AWS) is a good example, with its goal to regulate the development and use of the systems that “generally do not yet exist” [4]. From this perspective, roboethics research may be seen as a matter of a fascinating puzzle-solving that requires highly ingenious thinking. Puzzle-solving is understood here as a specific approach and attitude taken in the course of research rather than a way to fit the given pieces together in a predetermined pattern. One could argue this is the approach that has already been central to the roboticists’ thinking and profession. For example, it has been argued that an emphasis on the creative puzzle-solving aspects of engineering may help motivating girls to study engineering [5]. Roboethics too has sometimes been explicitly described in terms of “exciting challenges” and “thought experiments” [10]. The latter are even more stimulating when considered that robotics and the public perception of robots often concerns “projections in the future” [2] and “future visions” [11]. Thus, ethical reflection can be seen as a means that helps roboticists creating “a brave new world” rather than only build robotic systems, with all the inventiveness that it takes.

IV. REAL-WORLD COMPLEXITY

Roboethics has often been understood as a development and application of a set of principles and moral codes that apply to both robotic systems and robot developers. We argue here that ethics should also be seen as the actual force that shapes our real-life decisions and conduct, for example as part of organisational culture in business and government, professional ethics or environmental ethics. New developments in robotics bring ethical dilemmas and challenges that are “all too real” [6]. Also, resistance towards the implementation of robots or technical challenges related to changes in (work) roles, training issues, and users’ decisive trade-offs in using robots may only be revealed in practical applications, and may be culturally situated and pertain to users’ particularities that are hard to be foreseen

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prior to materialisation. Thus, we suggest that roboethics research should be linked to the real-world applications, where “[t]he usefulness of any set of values is demonstrated in its applicability to particular contexts” [8]. In fact, the very goal of roboethics is to help integrating robots in the human life world [9], the approach that goes hand in hand with the overall goal of robotics to develop systems capable to operate in the real-world environments [6]. Also, we argue here that aiming to address and understand the human-robot interplay in everyday life contexts significantly adds to the complexity of robotics research and brings it to the next level of mastery in puzzle-solving and pioneering work.

V. NEW PRODUCT DEVELOPMENT

with new product design and development, existing methods may yet be inadequate to cope with roboethical issues. For instance, there are advanced operational methods in marketing science, such as conjoint analysis, to optimise product design choices once the market segmentation is uncovered, segments’ size and user requirements are identified, and technical options have been determined [e.g. 3]. However, arguably, such methods may have limited usefulness in case of concurrency, endogeneity, and inherent uncertainty of research and development of both technology and market. Moreover, such methods cannot cope with the numerable potential, non-quantifiable ethical issues at stake in robot development. In an attempt to cope with the challenges posed, there have been several paradigm shifts in new product development methods, notably user involvement already during the ‘fuzzy frontend’, deliberate market selection, as well as open innovation style networking [1, 12]. However, particularly design choices made early on during development may, possibly unknowingly and unwillingly, in- and exclude particular potential users or particular applications. On top of that, privacy and safety issues may only become apparent in later product development stages, hard to anticipate, and design-technically costly to reverse. Such issues and those mentioned in the previous section (resistance and changing role, trade-offs in use, training and education required, etc.) may arguably arise from different (mis)conceptions about what the robot being developed actually constitutes. Moreover, given the novelty of robotics, various competing (entrepreneurial) firms, independent research institutes, national governments, and an assortment of other stakeholders may affect viability of design choices at different (future) stages of research and development. Robotics developments and roboethics are co-evolving, and likely to transcend the scope of an individual robot. New product development methods should accommodate this co-evolution and not only be concerned with ‘getting knowledge’ as mere design input but also with actively ‘bringing knowledge’, possibly engaging with a wider (potential) stakeholder population. That said, many of the ethical design challenges related to in/exclusion, safety, privacy, unintended use, training and education, changing roles and resistance, (mis)conceptions, etc., may require being addressed in different stages of robot development, but with sensible moderation. Given the feedforward of technological choices, we recommend that

roboticists are also concerned with whether, when and why to involve particular stakeholders in coping with the many roboethical issues that go beyond market research and product development. As such, roboethics may be considered intricately related to the robot research, development and design puzzle and the many trade-offs to be balanced.

VI. CONCLUSIONS

The subject and scope of the roboethics research offers unique philosophical, theoretical and methodological challenges to roboticists that are directly linked to how we conceive human-robot interaction. By approaching roboethics as a fascinating research puzzle, roboticists have the possibility not only to engage with intellectually stimulating “thought experiments” [10] but also to actually take responsibility for our current understanding and practices with regards to what is good and bad. The consequences of roboethics research go far beyond the field of robotics and HRI, as they have the potential to shape the entire future worlds and help addressing the ultimate puzzle, that of what it means to be human.

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