

# European robotics practitioners' attitudes towards the ethical impact of robotics and its regulation

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**Abstract** — This work illustrates our investigation on robotics researchers' viewpoints on the ethical dimension of robotics. In this study we analyse data collected from researchers in robotics in order to understand their perspective on an attempt of regulation of robotics in the EU. The collected data come from different research labs in robotics across the European continent. The main findings of this study are the individuation of several positions of robotics experts towards the ethical implication of robotics in society. This inquiry is a part of a wider integrative and experimental approach to robot-ethics which aspires to answer the unsolved challenges in this field of studies.

## I. TOWARDS NEW APPROACHES TO ROBOT-ETHICS

The diffusion of robots in our social contexts is bringing robo-ethics issues from the margins to the center of the scientific debate, and is engaging a variety of disciplinary domains in ethical inquiries on human-robot interaction. These interdisciplinary efforts, directed towards ensuring the "social sustainability" [1] of current developments of robotics, stimulates ethical inquiry on human-robot interaction to engage in a process of self-criticism and self-renewal, aimed at overcoming significant limits and gaps characterizing its expressions [2]. Based on Damiano's prior exploration, the primary insufficiencies affecting contemporary ethical investigation of human-robot interaction can be schematically listed and articulated as follows. (I) *Lack of effective disciplinary integration*: on two different sides a) expert investigations on ethics, but which are not well informed about human-robot interaction; b) inexpert ethical investigations which are realized by disciplines like robotics without a specific background in ethics. (II.) *Lack of a broad, interdisciplinary body of knowledge about the innovation and transformation that robots generate at the societal level*. Currently the body of knowledge available on robots tends to be limited to technical aspects. (III). The *technological determinism* that prevents us from detecting the dynamics of "mutual determination between society and robotics" in which the development of robots is inscribed [3], including the influences that philosophy itself - the "epistemology and ontology of the time" [2]. (IV). *A sort of resistance to the creation of the required ethical novelties*, due to the diffused tendency to address the emergent issues of robo-ethics. (V). The *stagnation of the ethical debate*, which often appears polarized in the sterile alternative between "techno-enthusiasm" and "technophobia". (VI). *Lack of engagement*

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*of the main voices of specialized ethical inquiry in the definition of guidelines* to maximize the benefits and reduce the risks of human-robot interaction, and focalization on a general condemnation of robots.

Despite much research of interest, these gaps imply that currently robo-ethic research appears still unprepared to fully meet the challenges imposed on our society and our future by the ongoing transformations related to the development and diffusion of robots. An experimental approach to the ethical dimension of the interactive dynamics involving humans and robots, in particular in the case of social robots, can be critical to address the unpredictable effects of human-robot interaction on the ethical behaviors and conducts of the (human and, in certain cases, robotic) agents involved. Making robo-ethics a mature branch of ethical inquiry means to renew, in an integrative and experimental way, ethical inquiry on human-robot interaction. Based on this point of view, the research presented in this article proposes an attempt to develop an integrative and experimental ethical investigation on a central issue for the sustainability of the diffusion of robots: regulation.

## II. OBJECT AND OBJECTIVES

The object of our research is to illustrate the outlooks of roboticists on ethical implications on robotics and their attitudes towards the governance of robotics. We explore these issues in the context of opinions on the recent motion to the European Parliament called Draft Report Motion on Civil Robotics identified [4]. This document included suggestions for a Code of Conduct for researchers in Robotics. We used the topics raised in this motion to provoke wider ethical reflections on Robotics from our participants. The objectives of this paper are to deepen the understanding and the reasoning behind the practitioners' viewpoints and use this knowledge as part of an experimental approach to robo-ethics.

## III. METODOLOGY

### A. Method

We have asked 4 groups of experts in robotics (one for each visited location) their point of view on a series of questions related to ethical implication in robotics. Each group of people come from a robotics lab linked to an institution or university located on the European continent. The average number of people for each group was 15 individuals (with 57 participants in total), and the data have been collected using hard copy questionnaires.

This study uses a mixed method combining qualitative and quantitative analysis. The creation of the questionnaire was subsequent to the embedding of the main investigator, a

philosopher, as part of a robotics research lab. This took place over three months at the initial location of data collection. The participation of the investigator to the activities of the lab was fundamental in order to formulate specific questions for the practitioners in robotics. The questionnaire is divided in four parts: a) About the Motion to the European Parliament; b) About the Code of Conduct; c) About the nascent branch of ethics that deals with Robotics; d) About the near future of Robotics. Two different types of questions are used: 1) multiple answer questions; 2) open-answer questions. Before the filling of the questionnaires, the investigator presented a seminar on the principal contents of the Motion to the European Parliament and led a small debate with the attendees. The purpose of the seminar was to ensure that all participants had knowledge of the contents of the motion prior to filling out the questionnaire and to provoke reflection on the ethical issues it raised.

### B. Locations

The data were collected from different research labs across Europe. The laboratories have been chosen on the basis of our network of collaboration, giving priority to the labs which are specialised in research on social robotics. We have focussed on social robotics research due the relevance of this branch of robotics for human society.

1. The United Kingdom - The first chosen lab is located in the UK. It was visited in 2017. This lab is specialized in Social robotics and Human-Robot interaction.
2. France - Two different labs from different institutions have been chosen from France. The visits took place in 2018. The two labs are in collaboration and together are involved in research in Robot Design and Social Robotics.
3. Italy - Two labs from two different institutions have been visited in 2019. These two labs are not linked but both of them are active in social robotics research.

### C. Qualitative analysis

The qualitative analysis was conducted on all the open-answer questions in order to identify and relate the relevant themes. We will summarize these in the following section.

### D. Quantitative analysis

The quantitative analysis illustrates the outcome of the multiple-answers questions. Demographic data was collected from participants on their level of education, field of study and whether they consider themselves a robotics researcher. Most of the closed forms questions consider only two different answers: Yes or No (we have also recorded participants declining to answer individual questions using the Abstained category). These responses provide context for the qualitative data, highlighting topics on which there was consensus (or a lack of it) among our participants. We are unable to report all of the quantitative results in this paper, but will show a few illustrative cases in the following section.

## IV. RESULTS

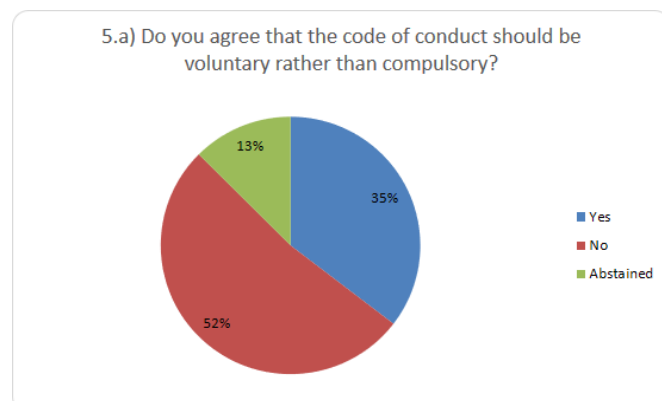


Figure 1. Responses to a closed form question on the Code of Conduct (from Section B of the questionnaire).

### A. Quantitative Analysis

The analysis on the multiple-answers has shown the main trends in how practitioners think about robot-ethics and regulation of robotics. Participants overwhelmingly (93%) responded that they consider ethical reflection on robotics useful. 82% of the participants think that politics should deal with robotics, versus the 12% of practitioners who do not agree (6% Abstained). 88% of them also feel the need for a Code of Conduct, and 52% have answered that they agree that the Code of Conduct should be compulsory (see Figure 1). On the question whether such a code can slow down research, they are evenly split between “No” and “Yes” respectively 49% and 46% (6% abstained). On the question of whether social robots can pose risks for human beings, the responses split as follows: 39% agree, 47% disagree and 14% abstained.

### B. Qualitative Analysis

An analysis of the data yielded a number of key themes which we labelled under the following headings and subheadings:

1. Participant/roboticist’s perception of ethical risk of robots/robotics research to society: i) Three different attitudes to ethical risks were evident in the data: the view that there are no risks, the view that there will be risks in the future, the belief that there are current risks/ethical implications. ii) Of the immediate risks, two were considered the most pressing: a) The risk of isolation - practitioners have underlined the risk of social robotics to influence the users’ willingness to socialize. b) Privacy and Security problems – attendees have specified that robots are subjected to the same security and privacy than other computer-based technologies, but there is a new element related to the manipulation of the physical environment which adds new ethical concerns. iii) No difference in ethical risk between robotics and other technologies – a number of participants expressed the view that robotics has exactly the same ethical implication as other new tech., arguing that technology can always be a risk for humans.

2. Participant/Robotist's attitude towards policymakers: i) Lack of knowledge: robotists perceived policymaker's knowledge of robotics to be lacking and overly influenced by science fiction. ii) Distrust: some participants expressed their concerns about policymaker's motivations, believing they might prioritise political interest over people's wellbeing.
3. Participant/Robotist views of the need for greater inclusion/collaboration from outside the field (including non-STEM perspectives and policy makers): i) Support for inclusion - Some researchers in robotics support the idea that assisting policymakers can largely improve the regulation of the robotics process. ii) Positive attitude towards politics - despite the distrust and the misunderstanding, practitioners in robotics display a positive inclination towards politics. Many of them look at politics as the space where it is possible to solve some of the ethical implications of robotics. Others have stressed that politics is necessary in order to preserve the rights of the population.

## V. DISCUSSION

Contrary to what one might traditionally expect from technologists, the majority of participants believe that politics is relevant to robotics research even if it means that it will interfere with or slow the research down. A consistent majority of practitioners and researchers in robotics support the idea of specific regulation for their profession, especially expressing a preference for a mandatory Code of Conduct. Furthermore they have shown interest in ethical and social implications, such as in potential problems of social isolation in users.

However, our study also reveals a number of barriers to developing effective communication and collaboration between these two areas. Although our study focused on robotists' perceptions, it also revealed a lack of consensus and understanding on the part of the robotists in terms of how ethics works and what ethical principles are. In addition, this study reveals a lack of consensus by experts in robotics that social robots may pose a risk for human society.

Strengthening collaborations with non-STEM research fields can help robotists to better understand and design for complex ethical issues. Our study demonstrates how embedded non-STEM experts in robotics laboratories can help to: a) make technologists more informed on topics in fields relevant to robotics and its applications, and b) challenge biases about robotics in non-STEM experts that arise from lack of interaction with practitioners and working robotic systems.

## VI. CONCLUSION

In conclusion, this work reveals perspectives that European practitioners in robotics have towards politics and policy makers and illustrates the reasoning behind their viewpoints. In addition, the findings show how a lack of meaningful collaboration between experts in robotics and policymaking on the motion investigated results in differences in priorities and preferred approaches to

regulation that can lead to a distrust of policy by practitioners. This highlights the need for prolonged and substantial interaction between disciplines in order to improve mutual understanding across fields. This work can be considered the first step of an experimental approach to robo-ethics being able to surpass the evident criticalities in robo-ethics studies. We believe that this integrative approach is necessary to address the ethical issues raised by the increasingly widespread use of social robots.

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