

Assertions in ethics of environmental robotics

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Abstract

The workshop ‘Assertions in ethics of environmental robotics’ will use a provocation format to elicit discussion with the attending audience in an interactive debate. A provocation, defined as “the action of provoking or inciting” [1], will present potentially polarising opinions related to the topic of environmental and ethical robotics. This extended abstract introduces the format of the interdisciplinary workshop.

Keywords: robotics, ethics, workshop, environmental, provocation

1 Introduction

Climate change, arising from global industrialisation [2], the unsustainable extraction of resources [3] and the resulting emissions from non-renewable energy sources [2, 4, 5], is impacting all inhabitants and ecosystems on Earth. The number and intensity of extreme weather conditions is increasing [4], food security is declining [6], biodiversity and the resulting ecosystems are changing [7, 8], species are becoming extinct [7], and human health is and will continue to be adversely effected by climate change [5].

Historical reliance on the linear economy [9] combined with threats to global food systems [6, 10], rising living standards, and a growing global population, has led to a greater implementation of autonomous technologies [2] and Artificial Intelligence (AI) enabled systems. These robotic and AI technologies are increasingly used as systems with an environmental purpose such as but not limited to; environmental health monitoring; ecosystem change monitoring; pest and crop control management; pollution management; chemical spill clear-up; and agricultural processes enhancement (including pollination, planting and picking); surveillance of human-animal conflict zones; and wildlife monitoring [9, 11–13].

However, environmental and agricultural robots present challenging ethical considerations that extend beyond traditional robotics ethics frameworks due to their interaction not only with humans but with complex ecosystems. In relation to people; these robots often form socio-technical systems which must seek to optimise the relationship between the "technical components and the social arrangements" [14], requiring reflections on economic impact, data privacy, community led-design, human oversight, and safety & security [12, 15, 16]. Working in nature and in agricultural environments prompts ethical considerations regarding: ecological footprint; biodiversity preservation; energy use; environmental impact underpinning the robot design, manufacturer, use and disposal; as well as sustainable development [13, 16].

This workshop aims to explore the ethical, ecological, and societal challenges posed by the increasing use of autonomous systems in response to Global Warming. By encouraging interdisciplinary dialogue, the workshop will encourage critical reflection on how environmental and agricultural robots can be designed not only for human benefit but considering ecosystems and planetary sustainability.

2 Provocation-based workshop

2.1 Structure and Methodology

The workshop adopts a participatory provocation-based format to stimulate discussion and critical reflection among participating researchers, policymakers, and technologists.

Three invited speakers will present provocative assertions - bold statements rooted in their area of expertise - designed to challenge prevailing assumptions and open space for debate. Each provocation will be accompanied by a brief overview of both supporting and opposing arguments to frame the discussion. Following each presentation, workshop participants will engage in facilitated group discussion to critically examine the provocation, explore its implications, and share insights from their own disciplinary perspectives.

To support open and inclusive dialogue, the workshop will operate under the Chatham House Rule: "Participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed" [17]. This is particularly appropriate for discussions of a sensitive or contested nature, and is intended to create a respectful environment in which disagreement and diverse viewpoints are welcomed.

This provocation-based workshop format is well-suited to addressing complex, emerging, and value-laden topics in environmental robotics, where disciplinary assumptions often differ, ethical positions are complex, and solutions are transdisciplinary in nature. By centring provocation as a method of engagement, the workshop invites participants to move beyond disciplinary silos, reflect on underlying values, and explore new directions for responsible innovation of environmental and ethical robotics.

2.2 Provocative statements

The guest speakers for this workshop will present provocations titled:

Elena Dieckmann: Autonomous robotic ecologists will revolutionise conservation by executing micro-scale ecosystem engineering - deploying swarms of nanobots that restructure soil microbiology to optimise biodiversity metrics without human intervention.

Kostas Karachalios: Environmental robotics requires ethical review boards with rigorous testing frameworks similar to those used for medical trials before deployment in natural ecosystems.

Richard Mawle: Autonomous agriculture systems will perpetuate conventional farming practices, further delaying the reforms needed to protect the environment.

2.3 Outcomes and Impacts

Following the workshop, the authors of this paper intend to collate and publish a summary of the arguments, counterarguments, and discussion points resulting from each provocation. The workshop and published summaries will guide future research on ethical considerations of agricultural and environmental robotics, outlining goals and priorities. This publication serves as a reference for researchers, industry practitioners, and policymakers by highlighting advancements in ethical environmental robotics.

3 Conclusion

Workshops offer a space for learning, collaboration, and creative problem-solving. This workshop, through carefully crafted provocations, invites participants to generate ideas and co-create a research agenda that reimagines the future of environmental and agricultural robotics. By bringing together experts from various fields such as robotics, environmental science, ethics, policy, sociology, and philosophy, we aim to host a debate focused on practices surrounding the development and implementation of technology that respects the natural environment and fosters sustainable agricultural methods for future generations. Our objective is to expand the discussion beyond human-robot interactions to embrace a more inclusive perspective that takes into account the needs of plants, ecosystems, and the environment as a whole. The technologies we create and roll out today will influence the biodiversity and ecological health of tomorrow. Through collaborative efforts, open dialogue, and innovative thinking, we aspire to reshape how robotics can benefit not only humanity but the entire planet. This workshop represents a significant milestone in realising our vision,

and we encourage all participants to help lead the way toward a more responsible and regenerative technological future.

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