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Robots for Social Good:
Exploring Critical Design for HRI

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Abstract—**Robots are being increasingly developed as social actors, entering public and personal spaces such as airports, shopping malls, care centres, and even homes, and using human or animal-like social techniques to work with people. Some even aim to engineer social situations, or are designed specifically for an emotional response (e.g., comforting a person). However, if we consider these robots as social interventions, then it is important to recognize that the robots design – its behavior, its application, its appearance, even its marketing image – will have an impact on the society and in the spaces it enters. While in some cases this may be a positive effect, social robots can also contribute negatively, e.g., reinforcing gender stereotypes or promoting ageist views. This full-day workshop aims to offer a forum for Human-Robot Interaction (HRI) researchers to explore this issue, and to work toward potential opportunities for the field. Ultimately, we want to promote robots for social good that can contribute to positive social changes for socio-political issues (e.g., ageism, feminism, homelessness, environmental issues). The political aspects of technologies have long been scrutinized in related areas such as Science and Technology Studies (STS) and Human-Computer Interaction (HCI). In particular, critical design explicitly targets the design of technologies that can contribute to our understanding of how technology can impact society. This workshop aims to strengthen this discussion in the HRI community, with the goal of working toward initial recommendations for how HRI designers can include elements of critical design in their work.**

Index Terms—**Critical Design, Participatory Design, Robots for Social Good**

I. BACKGROUND

The political aspects of technologies have long been investigated in science and technology studies (STS) [1], [2]. For example, Weber found that –since the early cockpit design was developed based on male anthropometry– the design marginalized female pilots and thereby reinforced sex discrimination in aviation [3]. In HRI, recent assistive robot studies exemplify how robot designs are closely associated with socio-political issues, such as ageism [4]. As some robots are built using a deficit model of aging, where older adults are characterized by their losses, these robot designs can contribute to solidifying the stereotyped representations of older adults in society.

In HCI, researchers have suggested design methodologies that support designers to be sensitive to their unexamined biases, directly within the technology design processes (e.g., reflective design [5], value-sensitive design [6], and participatory design [7]. These critical design approaches explore technology designs as a way to engender positive social changes for various issues (e.g., homelessness, sex discrimination, refugee crisis, ageism, developmental differences) [7]–[9].

Our agenda is to promote such activities, inspired by critical design, in the HRI community. In this workshop, we aim to explore how robots can be critically designed for social issues by inviting interdisciplinary researchers from HRI, HCI, STS and other relevant areas (e.g., roboethics), facilitating discussions and activities. We hope this workshop motivates the HRI community to increasingly look broadly and consider users and their needs in terms of usefulness and efficiency, and look more towards social empowerment.

II. WORKSHOP ACTIVITIES

The aim of this full-day workshop is to provide a forum to share and learn from each other about recent research and theoretical perspectives on robots for social good (see list of topics below). Our program allows for presentation, extended discussion, and reflection time through activities to address promising approaches and encourage further work. A large part of this effort is to bring together a community of researchers, strengthen existing connections, and build new ones across disciplines.

We have invited three speakers. Dr. Chi Hyung Jeon is a Science and Technology Studies scholar, who will detail how robots are shaped as part of socio-political dynamics of broader society, to initiate our discussion on how to incorporate this view practically in HRI. Dr. Selma Sabanovic is an established leader in HRI, with a background in Science and Technology Studies, and will discuss how robots can be critically designed as socio-political systems. Dr. Ana Paiva is an established leader in HRI. She will discuss Prosocial Robotics that explores autonomous agents with the aim of fostering and supporting pro-social behaviour in a hybrid society of humans and machines. In addition to these invited presentations, we plan themed discussion sessions around the key topics that are raised by accepted paper submissions.

Throughout the day, we will alternate presentations sessions (curated from submissions) and hands-on design activities. Each themed presentation session will end with a group discussion on the issues and topics in the presented papers in

that session. The hands-on design activities have the goal to creatively introduce critical design strategies within the HRI community and raise awareness of the social issues related to robot design. This workshop aims to be a networking-building space for researchers to learn more about the design of social robots driven by social good. Finally, the organizers plan to develop a position paper stemming from the workshop, addressing our driving questions, for submission (e.g., to Transactions on Human-Robot Interaction).

III. Topics and Target Audience

In this workshop, we aim to bring together researchers and practitioners from a wide range of different disciplines who are interested in designing robots for social good, and for raising awareness of potential social impacts of robots. We encourage both people with experience in critical design and Science and Technology studies, as well as people with no such background but an interest, will participate. We will call for participation in the workshop via mailing lists and social media groups of HRI, HCI and STS scholars.

Topics of interests we covered in this workshop include (but are not limited to):

- Human-centered algorithms
- Case studies empowering socially marginalized population (e.g., older adults, women)
- Application of critical social science theories to robot design (e.g., feminism)
- Alternative or critical robot design methodologies (e.g., participatory design, value sensitive design)
- Robot design and application ethics.

IV. Organizers

Hee Rin Lee is a postdoctoral scholar in Contextual Robotics Institute at UC San Diego. Her research explores robots for social good with the aim of empowering marginalized groups including older adults and women via robot design process. Her research has yielded best paper nominations at the premier HCI conferences including UbiComp and CHI, and she has served on program committees for the ACM/IEEE Human-Robot Interaction and the ACM Participatory Design Conference.

EunJeong Cheon is a Ph.D candidate in Human computer interaction/Design at Indiana University Bloomington. She is also interested in developing alternative design approaches that would enrich our sensibility to design contexts. Her work in particular looks at what assumptions and values are baked into our sociotechnical practices and artifacts. She has explored this agenda at the intersection of HCI, HRI, and STS, and conducted through ethnographic research, value sensitive design, speculative design, and design practices.

Maartje de Graaf is an Assistant Professor of Information and Computing Sciences at Utrecht University, The Netherlands. Her research focuses on peoples social, emotional and cognitive responses to robots aiming for the development of socially acceptable robots. She is Associate Editor of THRI

and has co-organized multiple workshops before at HRI, RO-MAN, and ICSR. So far, her research has been awarded with two grants, a best paper award, was selected in 2017 as one of 25 women in robotics to watch by Robohub.

Patrícia Alves-Oliveira is a Ph.D. candidate in Human-Robot Interaction at ISCTE-IUL, Cornell University, and INESC-ID, in a multidisciplinary graduate program. Patrícia is interested in using robots to stimulate creativity in children during play. Patrícia is the founder of The Robot-Creativity Project, a project dedicated to the design of social robots for creativity purposes. Patrícia was involved in the organization committees of HRI Pioneers 2017, AI for HRI Symposium, and several Workshops within the field of design and HRI. She has published in conferences such as HRI, IDC, ICSR, RO-MAN, RSS, and IROS.

Cristina Zaga is Cristina is a Ph.D. candidate at the HMI group (University of Twente) and a visiting scholar at the RiG lab (Cornell University). Cristina's research is influenced by embodied interaction design, research through design and participatory practices. Her work received an HRI student design competition award and has been exhibited at the Eindhoven Design Week 2017. Cristina served in the organization committee of CHI 2018/2019, HRIPioneers 2018, CSCW2018. She is one of the founders of the child-robot interaction workshop series. Cristina is a Google Women TechMaker Scholar 2018.

James Young is an Associate Professor in Computer Science at the University of Manitoba, Canada. James' team focuses on designing human-robot experiences and interfaces, particularly considering the broader social context of interaction. Their work includes leveraging psychology to improve teleoperation interfaces, human- or animal-like language for communication, and exploring limits of social interaction with robots including exploring robots in positions of authority, robots criticizing people, sexist robots, and robots manipulating people.

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