

Robots in healthcare: Interdisciplinary co-design and technoethics education

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1. Abstract

The experience of co-designing two assistive robot prototypes to help people with physical and mental disabilities, respectively, will be described. The first one is a small robot arm, equipped with a camera, a force sensor and an interactive tablet, for feeding people in large healthcare centres, which has been developed by several engineers and a social scientist in our research group, together with the managing team, physicians, nurses, innovation technicians and sixty voluntary patients in the Sociosanitary Park Pere Virgili in Barcelona. The second prototype has been co-designed with a neurologist, a therapist and a social worker to provide cognitive training to the patients in a day-care facility of the ACE Alzheimer Centre in Barcelona. Among the lessons learned, the importance of interdisciplinarity, human-centric deployment, personalization, and technoethics training stand out. Materials to teach a course on 'Ethics of Social Robotics and AI' and to foster debate, by exploiting the engaging appeal of science fiction narrative, will be presented. While social robotics shares several ethics issues with AI, embodiment makes a huge difference in other aspects, some beneficial and some riskier.

2. About the speaker

Carme Torras is Research Professor at the Spanish Scientific Research Council (CSIC) since 1991. With a background in mathematics and computer science, Prof. Torras has focused her research on cognitive robotics, neurocomputing, artificial intelligence, and social robotics, as well as on the socio-cultural implications of robotics. In acknowledgement of her contributions, she has won numerous awards. She was research leader of several large-scale European research projects on cognitive and social robotics, and has co-authored books, 149 journal papers, and about 220 conference papers and book chapters. However, Prof. Torras

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also has published outside of academia: her commitment to disseminate and discuss the social implications of robotics with wide audiences has led her to write two science fiction novels and participate in eleven collective volumes, where ethical issues in technology play a key role. Her novel *La mutació sentimental* (Pagès Editors, 2008), winner of the Manuel de Pedrolo and Ictineu awards, has been translated into Spanish (Editorial Milenio, 2012) and into English as *The Vestigial Heart* (MIT Press, 2018), and published along with online materials to teach a university course on “Ethics in Social Robotics and AI”. Since 2020, she is a member of the Advisory Committee of Ethics in AI of the Catalan Government, the Ethics Committee of UPC, and Vice-President of the Ethics Committee of CSIC.

3. Commentators

Since this plenary lecture was delivered remotely, it was followed by a moderated onstage dialogue between the lecturer, invited interlocutors, and the audience at the conference venue. This setting was chosen to bridge the distance between virtual and embodied presence and further contextualize the content of lecture for the interdisciplinary audience of RP conferences.

3.1 Interlocutor 1: Chunfang Zhou

Chunfang Zhou is associate professor in the Department for Mathematics and Computer Science at University of Southern Denmark (SDU). At SDU, she co-directs the Center for Research in Science Education and Communication and a member in Center of AI Science and Application and Center for AI Ethics. She gained her BA degree in Industry Automation and Information Engineering, an MA degree in Philosophy of Science and Technology, and a PhD degree in STEM Education. Her research locates in STS studies focusing on creativity and its relations to STEM education, human-AI interaction, responsible innovation, and social robot development, etc. She has authored and co-authored over 120 peer-review publications.

3.2 Interlocutor 2: Alan Winfield

Alan Winfield is Professor of Robot Ethics and (formerly) Director of the Science Communication Unit at the University of the West of England (UWE), Bristol, Visiting Professor at the University of York, and Associate Fellow of the Centre for the Future of Intelligence, Cambridge. He co-founded the Bristol Robotics Laboratory and his research is focused on the science, engineering and ethics of intelligent robots. Winfield is an advocate for robot and AI ethics; he sits on the executive of the IEEE Standards Association Global Initiative on Ethics of Autonomous and Intelligent Systems, and chairs Working Group P7001, drafting a new IEEE standard on Transparency of Autonomous Systems.