

Personalising Robots Behaviour in Social Human-Robot Interactions

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I. AIMS AND SCOPE

The success of personal robots is related to their ability to autonomously tailor their behaviour according to the individual's culture [1], preferences [2], and cognitive and physical abilities [3], among others. Personalisation can significantly enhance human-robot interactions in various real-world scenarios by increasing engagement through tailored content [4], building trust and rapport, improving adherence to the interaction, and enhancing task performance [5]–[7]. Nonetheless, developing robots capable of doing so necessitates endowing them with specific perceptual and reasoning capabilities [8] along with designing them with the main stakeholders to ensure that their needs can be properly encountered.

Due to their typical contexts of use, social robots are requested to adapt their behaviour in both short and long-term interactions. To this end, robots need to be able to handle the high uncertainty of the environments as well as the unpredictability of human behaviour which is influenced by various factors, such as their motivations, attitude and interactions, all of which can change over time [9]. Additionally, robots need to be able to accurately model and predict human intentions and beliefs (Theory of Mind) [10] in order to anticipate human actions and provide the most appropriate response [11].

Apart from being able to tailor their behaviour autonomously, robots must also be easy for non-experts to personalise [12]. This involves developing approaches that allow non-experts to set up and teach new behaviours to the robot, such as through demonstration [13], [14]. Enabling non-experts to initialise the robot can also help to avoid the “cold start” problem and speed up the process of achieving reasonable behaviour [15].

Lastly, personalisation also has ethical implications, particularly when it is used with vulnerable populations. For example, incorrect personalisation in healthcare settings [16] can lead to inadequate care and decrease trust, acceptance,

and use of robots by healthcare professionals [17]. Another key ethical concern around personalisation is privacy, as personalisation typically involves collecting personal information. Additionally, the use of machine learning to personalise behaviour carries the risk of perpetuating existing biases [18].

The special session is perfectly aligned with the conference theme of “Embracing Human-Centered HRI”. This session focuses on creating robotics systems that can personalise their behaviour according to human values and requirements by involving the main actors in the entire design process as well as in the development of the technology. This approach ensures that also ethical and privacy considerations are taken into account when deploying such systems.

The session will focus on the impact of robot personalisation and behavioural adaptation in social human-robot interactions. In particular, this special session aims at bringing together a multidisciplinary group of researchers from areas including, but not limited to, psychology, neuroscience, computer science, robotics, and sociology, to share and discuss current approaches to empowering social assistive robots with adaptive and learning capabilities in order to foster research and development of robotic solutions specifically designed for meeting the individual's unique needs. Topics include, but are not limited to, the following:

- Personalisation in short and long-term HRI
- User modelling in HRI
- Robot's personality
- Context and situation awareness for robots
- Engagement evaluation and re-engagement strategies
- Personalised dialogue with robots
- Personalised non-verbal behaviour with robots
- Adaptive human-aware task planning
- Theory of Mind for adaptive interaction
- Machine Learning for robotic personalisation
- Lifelong (continual) learning for adaptation
- Adaptation in multimodal interaction
- Affective and emotion-adapted HRI
- Persuasion in HRI
- Culture-aware robots
- Evaluation metrics for adaptive robotic behaviour
- Ethical implications of personalisation
- Robot customization and teaching

II. TENTATIVE SPEAKERS

- Francesco Vigni, University of Naples, Italy
- Mehdi Hellou, University of Manchester, UK
- Gorgeous Angeloupulous, University of Naples, Italy

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- Esteve Valls Mascaro, Technische Universität Wien, Austria
- Rahul Singh Maharjan, University of Manchester, UK
- Barbara Bruno, Karlsruhe Institute of Technology, Germany
- Dimitri Lacroix, Bielefeld University, Germany
- Imene Tarakli, Sheffield Hallam University
- Goldia Nejat, University of Toronto, Canada
- MaryAnne Williams, University of New South Wales, Australia
- Katie Winkle, Uppsala University, Sweden
- Nikhil Churamani, University of Cambridge, UK
- Alyssa Kubota, University of California San Diego, USA
- Raquel Ros, Pal Robotics, Spain
- Aniol Civit, Institut de Robotica i Informatica Industrial, Spain

III. ORGANISERS AND BIOGRAPHIES

Antonio Andriella is a Research Scientist at Pal Robotics awarded with a Marie Skłodowska-Curie cofound fellowship in the H2020 project PRO-CARED which aims at designing social robots with proactive personalised behaviour during long-lasting interactions. He received his PhD with a thesis entitled "Personalising robot assistance for cognitive training therapy" from the Institut de Robòtica i Informàtica Industrial (IRII, CSIC-UPC). His work focuses on designing, developing, and evaluating interactive social systems that can be personalised and adapted to their users over short-term and long-term interactions, based on individuals' unique needs and goals. He organised workshops on topics related to trust, ai, ethics and personalisation at HRI, RO-MAN and ICSR conferences. He served as guest editor of several special issues of journals such as the International Journal of Social Robotics, Paladyn Journal of Behaviour and Interaction Studies and as associate editor at IROS 2021-22 and ROMAN 2022.

Wing-Yue Geoffrey Louie is an Assistant Professor at Oakland University (USA) and Director of the Intelligent Robotics Laboratory where he is now the principal investigator for the National Science Foundation project on developing approaches to enable healthcare professionals to teach robots communication strategies for effective intervention delivery and University of Michigan's Automotive Research Centre project on studying human-robot interactions in video game engines. The core theme of his research is on the development of robot technology that can be easily customised by non-experts and personalised according to their needs. His research has been integrated in social and service robots for applications including therapy for autism spectrum disorder, older adult care, physiotherapy, early childhood education, search and rescue, and autonomous driving.

Barbara Bruno is a Tenure Track W1 Professor at the Karlsruhe Institute of Technology (KIT, Germany).

Barbara's research interests lie in Human-Robot Interaction, Social Robotics and Socially Assistive Robotics. Building on her PhD research, she co-founded the start-up company Teseo, focusing on assistive technologies for older adults and in 2017-2019 was Technical Manager of the H2020 project CARESSES, which developed a culturally-competent care robot for older adults. In 2019-2023, as a Postdoctoral Researcher at the École Polytechnique Fédérale de Lausanne (EPFL, Switzerland), she contributed to the MSCA ANIMATAS focusing on the development of socially assistive robots for education. Barbara holds an M.Sc. degree and Ph.D. degree in Robotics, both from the University of Genova, Italy. She is currently serving as Associate Editor for the IEEE "Robotics & Automation Letters" journal and the Springer journal on "Intelligent Service Robotics" and has contributed as organiser, invited speaker or panellist to a number of workshops and conferences on assistive robotics, personalised robotics and child-robot interaction. She has published more than 70 articles in international journals and peer-reviewed international conferences.

Alessandro di Nuovo is Professor of Machine Intelligence at Sheffield Hallam University and the leader of Technological and Digital Innovation for promoting independent lives at the Advanced Wellbeing Research Centre. He is also the leader of the Smart Interactive Technologies research laboratory of the Department of Computing. He has published over 120 articles in computational intelligence and its application to cognitive modelling, human-robot interaction, computer-aided assessment of intellectual disabilities, and embedded computer systems. Currently, Prof. Di Nuovo is editor-in-chief (topics AI in Robotics; Human Robot/Machine Interaction) of the International Journal of Advanced Robotic Systems (SAGE). He is serving as Associate Editor for Robotics and Applied Sciences (MDPI) journals. He has led several special issues in journals, such as IEEE Cognitive and Developmental Systems, Adaptive Behaviour, International Journal of Social Robotics.

Silvia Rossi is an associate professor at the Department of Electrical Engineering and Information Technologies, University of Naples Federico II, where she is the scientific director of the PRISCA Lab (Intelligent Robotics and Advanced Cognitive System Projects) Laboratory. She is an Associate Editor for the International Journal of Social Robotics, Pattern Recognition Letters, and for Intelligent Service Robotics journal. Prof. Rossi has been involved in several EU and non-EU projects. She is currently the principal investigator and coordinator of the MSCA-ITN-2020 PERSEO (European Training Network on Personalized Robotics as Service Oriented applications), PI of the HORIZON-TMA-MSCA-DN project TRAIL (TRANSPARENT, INTERPRETABLE ROBOTS), PI of the CHIST-ERA IV project COHERENT (COLLABORATIVE HIERARCHICAL ROBOTIC EXPLANATIONS). She was the general chair of RO-MAN 2020 and RO-MAN 2022, Program

Chair of ICSR 2020 and ICSR 2023, and she is on the program committee of several international conferences on human-robot interaction and artificial intelligence. Her research interests include Socially Assistive Robotics, Human-Robot Interaction, Cognitive Architectures, and User Profiling and Recommender Systems. She published over 180 papers in international journals, books, and conferences.

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