

**Dissertation press release**

**16.09.2020**

## **Robots that ask questions can learn from novice users**

<b>Title of the dissertation</b>	Teacher-Learner Interaction for Robot Active Learning
<b>Contents of the dissertation</b>	<p>With robots being adopted in an increasing number of new application areas, such as health care, logistics, and domestic services, their target audience has grown to include end-users, such as physicians and nurses in healthcare facilities, who may lack the technical skills needed to program robots in the traditional manner. In this dissertation, I propose a suite of Machine Learning methods that allow robots to learn by interacting with humans-in-the-loop.</p> <p>Two ways of teaching robots are adopted in the dissertation: through demonstrations and through questions. With demonstrations, the user can present the robot with examples of the desired behavior, avoiding the need for traditional programming techniques. While user-friendly, demonstrations have however an intrinsic flaw: they require the user not only to be an expert at the taught task but also at providing the robot with good demonstrations.</p> <p>To address the consequences of this rarely met requirement, I propose to make robots active part of the teaching process, allowing them to ask questions to their human teachers. The dissertation therefore presents Active Learning (AL) methods that allow robots to learn from questions in an efficient manner. Particular attention is paid to the design of robot questions that are understandable by humans yet informative for the robot's learning process. The results from this dissertation show how questions can be effectively used for robot learning problem, both in combination with demonstrations and standalone. Furthermore, the dissertation analyzes the interaction between a robot asking questions and the human teacher answering them, highlighting issues related to the transparency of the learning process and the effects of different query selection strategies on the people's ability to answer questions.</p>
<b>Field of the dissertation</b>	Robotics, Human-Robot Interaction, Active Learning
<b>Doctoral candidate</b>	Mattia Racca, M.Sc. Born in Carmagnola (Italy), 1991
<b>Time of the defence</b>	30.10.2020 at 14:00 EET
<b>Place of the defence</b>	<a href="https://aalto.zoom.us/j/61397232666">https://aalto.zoom.us/j/61397232666</a>
<b>Opponent</b>	Professor Tony Belpaeme, Professor at Ghent University (Belgium) and at University of Plymouth (United Kingdom).
<b>Custos</b>	Professor Ville Kyrki, Aalto University School of Electrical Engineering, Department of Electrical Engineering and Automation
<b>Electronic dissertation</b>	<a href="http://urn.fi/URN:ISBN:978-952-64-0055-6">http://urn.fi/URN:ISBN:978-952-64-0055-6</a>
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