

Dissertation press release

21.10.2019

Incremental and Transfer Learning of Contextual Skill Model for Robots

Title of the dissertation	Incremental and Transfer Learning of Contextual Skill Model for Robots
Contents of the dissertation	<p>Motion and manipulation skill learning in humans involves several building blocks such as memorization, imitation, adaptation, optimization, and generalization. The core purpose of this thesis is to endow robots with similar efficient skill learning capabilities.</p> <p>The thesis proposes a framework consisting of learning from human to achieve an initial policy, optimizing the policy efficiently by guided exploration, skill model for generalizing the policy to new situations, model selection for controlling the complexity of skill model, and active task selection to learn a skill faster. Using these key components, learning frameworks can be constructed which provide robots with the capability to acquire motion and manipulation skills autonomously.</p> <p>We studied skill learning in two contexts: in-contact and free-space motions. In brief, this thesis investigates how to: (1) learn a policy for in-contact tasks such as wood planing; (2) generalize a free-space motion policy such as basketball throwing to new situations; and (3) transfer a skill from simulation to real world.</p>
Field of the dissertation	AUTOMATION, SYSTEMS AND CONTROL ENGINEERING.
Doctoral candidate	Murtaza Hazara
Time of the defence	20.11.2019 time 12:30
Place of the defence	Aalto University School of Electrical Engineering, lecture hall TU2 (TUAS building), Maarintie 8, Espoo
Opponent	Professor Tamim Asfour , Karlsruhe Institute of Technology (KIT) , Germany
Custos	Professor Ville Kyrki, Aalto University School of Electrical Engineering, Department of Electrical Engineering and Automation
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