Learning Robotic Skills using Stable Dynamical Systems

Online seminar
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Speaker Matteo Saveriano, Innsbruck University

Abstract
Imitation learning, which is the capability of learning new skills by imitating other people's actions, is a big driver in the development of sensory-motor system in human beings.
In robotics, imitation learning arises as a prominent approach to rapidly acquire new skills without explicitly programming them. This talk presents data-driven approaches to learn stable robotic skills from human demonstrations. The key idea is to represent the motion as a parameterized dynamical system and to learn the parameters while preserving the stability of the system. We then discuss several useful properties of the dynamical system formulation and show how to exploit them for constrained and reactive motion planning. The last part of the talk presents on-going research on learning periodic orbits evolving on Riemannian manifolds.

Biosketch
Matteo Saveriano received the Bachelor and Master degrees from Università degli Studi di Napoli "Federico II" in 2008 and 2011 respectively, and a Ph.D. from the Technical University of Munich in 2017. After his Ph.D., he was a post-doctoral researcher at the German Aerospace Center (DLR) and at the University of Innsbruck. He is currently a tenure-track assistant professor at the Department of Computer Science and at the Digital Science Center of the University of Innsbruck. His research is at the intersection between learning and control and attempts to integrate cognitive robots into smart factories and social Environments through the embodiment of AI solutions, inspired by human behavior, into robotic devices.

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