Invited Talk:

ISTITUTO ITALIANO DI TECNOLOGIA

Machine Learning Algorithms for Robot Control

Petar Kormushev, PhD

Abstract

Endowing robots with human-like abilities to perform motor skills in a smooth and natural way will greatly promote the use of robots in everyday life. However, acquiring new motor skills is not simple and involves various forms of learning. The efficiency of the process lies in the interconnections between imitation and self-improvement strategies.

Similarly to humans, a robot should ideally be able to learn new skills by employing such mechanisms. Some tasks can be successfully transferred to the robot using only imitation strategies. Other tasks can be learned very efficiently by the robot alone using reinforcement learning.

The recent development of compliant robots progressively moves their operational domain from industrial applications to home and office uses, where the role and tasks can not be determined in advance. While some tasks allow the user to interact with the robot to teach it new skills, it is generally preferable to provide a mechanism that permits the robot to learn to improve and extend its skills to new contexts under its own guidance.

I will present my efforts in developing machine learning algorithms which allow robots to learn faster and more successfully real-world skills.

Biography

http://kormushev.com

Petar Kormushev is a team leader (equivalent to U.S. Assistant Professor) at the Advanced Robotics department of the Italian Institute of Technology (IIT). His research interests include robotics and machine learning, especially reinforcement learning for intelligent robot behavior.

In 2009 he obtained a PhD degree in Computational Intelligence from Tokyo Institute of Technology. He also holds a MSc degree in Artificial Intelligence, a MSc degree in Bio- and Medical Informatics, and a BSc degree in Computer Science.

He has participated in the INFRAWEBS project for designing the future Semantic Web, as well as the Japanese NEDO project for developing next-generation robots. He received the first “John Atanasoff” award, and a 4-year Japanese research fellowship.