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Presentation Title:

How Motor Control Inspires Soft Robotics Technologies for Prosthetics and Rehabilitation

Abstract:

Robotics has gone through a transformation in the last decade. A conceptual revolution, started in the early 2000's, has caused a steep transition from traditional, heavy industrial robots to safe, light, nimble co-bots which can co-exist and co-operate with humans, entering in touch with them. To do so, robots have become lighter, smaller, softer, and more intelligent.

The technological revolution of soft, intelligent machines today is spilling over from robotics to bionics. Not only soft technologies are safer, more effective and more adaptive: they can be above all more natural, as their motion and interaction patterns are dictated by similar principles as those moving our own human limbs. In the near future, users will be able to include soft bionic devices into their body schema, sending inputs and receiving feedback which match our inner model of interaction with the outside world.

To do so, however, a far deep understanding of how humans control their bodies is in order. It is here that motor control sciences and robotic

engineering together can produce novel insights and results. I will discuss several instances of application of these new ideas to robotic-aided rehabilitation, from prosthetics to assistance in upper motor neuron syndrome.

Short CV:

Antonio Bicchi is a scientist interested in robotics and intelligent machines. After graduating in Pisa and receiving a Ph.D. from the University of Bologna, he spent a few years at the MIT AI Lab of Cambridge before Professor of Robotics at the University of Pisa. In 2009 he founded the Soft Robotics Laboratory at the Italian Institute of Technology a Genova. Since 2013 he is Adjunct Professor at Arizona State University, Tempe, AZ. His work has been recognized with many international awards and has earned him five prestigious grants from the European Research Council (ERC). He launched initiatives such as the WorldHaptics conference series, the IEEE Robotics and Automation Letters, and the Italian Institute of Robotics and Intelligent Machines.