

Bioinspired Soft Robotics: Lessons from Nature and Interdisciplinary Research Challenges

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The study of living organisms sheds light on principles that can be fruitfully adopted in robotics. Biology suggests simplifying principles that allow complex systems, like living beings, to cope with a complex world. That can help push the boundaries of robotics technologies and build robotic systems for service tasks.

Largely inspired by the observation of the role of soft tissues in living organisms, the use of soft materials for building robots is one of the current challenges in robotics research. Living organisms exploit soft tissues and compliant structures to move effectively in complex natural environments. Understanding and adopting the principles behind this, like embodied intelligence and morphological computation, allows to develop robots with additional abilities and to facilitate more efficient accomplishment of tasks. Soft robotics is an interdisciplinary endeavour. Not only the soft bodyware needs rethinking and innovation, but also the way soft robots are modelled and controlled.

Biology is an endless source of inspiration for robotics. In addition to this, biology can help envisage future robots, and future technology in general, that are better integrated in the natural environments: robots that can adapt and evolve, that can scavenge the energy they need, that can self-heal, that can biodegrade at the end of their life.