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Animal-Robot Interaction

Title
Animal-Robot Interaction: Relevant Works at the Organizing Institution

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Abstract
The high resonance on the society robotics has shown in the last decades has also impacted research contributions in animal behavioural ecology. Animal-robot interaction represent a fascinating field of biorobotics and bionics, proposing the use of robotic animal replicas as an advanced method for investigating and control animal behaviour. Herein, different case studies, carried out at The BioRobotics Institute of Scuola Superiore Sant'Anna (Pisa, Italy), have been reported. Innovative approaches to establish animal-robot interactions successfully enabled to investigate and control natural-artificial systems, by exploiting the synergic contribution between engineering and biology. Several behaviours that play a key role in the energetics and the physiology of a species (e.g. aggressive behaviours, courtship displays; the coalescence of animal aggregations and their location in the space) have been modulated, thus potentially affecting the fitness of a species. These results can greatly contribute to the management of natural systems and to control animals used as biosensors in the environment, pushing beyond the current state of the art in animal-robot mixed societies, as well as in multi-agent systems. We also provided a new paradigm of neuro-robotics by introducing biorobotic artifacts in neuroethological studies, and in particular in investigation focusing on laterality of several arthropod species. In addition, the new scientific knowledge provided here can be exploited to design optimized control strategies in artificial systems.

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