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A biologically-inspired model for human-machine adaptation

Yves Rybarczyk[1], Daniel Mestre[1], Philippe Hoppenot[2], Etienne Colle[2]

[1]Mouvement et Perception, UMR CNRS 6152, Marseille, France
[2]Laboratoire Systèmes Complexes, FRE CNRS 2494, Evry, France
rybar | mestre@laps.univ-mrs.fr
yrybarc | hoppenot | colle@iup.univ-evry.fr

Abstract

The required objective for the design of a machine to be used by a human operator is its adaptation to the user's capabilities. According to this logic, the ideal system should perfectly fit into the human sensori-motor loop. The system would disappear from the field of consciousness and the operator would use it as a "natural" extension to his/her own body.

The present study investigates a method based on biological models proposed for the control of action. We tried to evaluate whether an operator, remotely controlling the displacements of a mobile robotic device, is able to integrate the dynamical properties of the robot into his/her sensori-motor schema. The study was based on the "power law" model, linking the geometry and kinematics of a movement. The results show that the nature of the human-machine adaptation depends upon temporal aspects of the linkage between the robot's "vision" and "locomotion".

Keywords: teleoperation, biorobotics, adaptation, ergonomics, human-centered system.