Video observation of humanoid robot movements elicits motor interference

Anthropomorphic "humanoid" robots are suggested to be more competent in social communicative interactions than industrial robots, because humans interact more intuitively with them. It is, therefore, critical to evaluate the acceptance of an agent as possible partner for joint interaction. One possible method is to utilize the phenomenon of motor interference (MI). It claims, that observation of an incongruent movement of another individual leads to a higher variance in one's own movement trajectory. Although this effect has been demonstrated while observing a human agent, the researchers were unable to show increased variance in the subjects' movements if they observed an arm of an industrial robot moving with piecewise-constant velocity. In contrast, in other recent studies, MI was demonstrated when subjects watched a humanoid robot performing biological movements based on prerecording of a human experimenter, even if it was not the case when the same robot moved with constant (artificial) velocity. The purpose of the present study was two-fold: 1) we aimed to replicate these results using video-presentations of the agents, and 2) we asked whether quasi-biological movement trajectories are sufficient to elicit MI. We presented subjects, who were instructed to perform horizontal and vertical arm movements, with videos of a human agent or of a humanoid robot, who performed congruent or incongruent arm movements. Robotic movements were produced with a quasi-biological minimum-jerk velocity profile. We found
MI both for the human agent and the robot, suggesting that an artificial human-like movement velocity profile (minimum-jerk) is sufficient to facilitate perception of humanoid robots as interaction partners, and that the measurement of MI using a face-to-face video setup can serve as a tool for objectively evaluating humanoid robots.

Stichworte: baja, jast, joint-action, robotics, cotesys


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