Biological Movement Increases Acceptance of Humanoid Robots as Human Partners in Motor Interaction

Abstract:
The automatic tendency to anthropomorphize our interaction partners and make use of experience acquired in earlier interaction scenarios leads to the suggestion that social interaction with humanoid robots is more pleasant and intuitive than that with industrial robots. An objective method applied to evaluate the quality of human–robot interaction is based on the phenomenon of motor interference (MI). It claims that a face-to-face observation of a different (incongruent) movement of another individual leads to a higher variance in one’s own movement trajectory. In social interaction, MI is a consequence of the tendency to imitate the movement of other individuals and goes along with mutual rapport, sense of togetherness, and sympathy. Although MI occurs while observing a human agent, it disappears in case of an industrial robot moving with piecewise constant velocity. Using a robot with human-like appearance, a recent study revealed that its movements led to MI, only if they were based on human prerecording (biological velocity), but not on constant (artificial) velocity profile. However, it remained unclear, which aspects of the human prerecorded movement triggered MI: biological velocity profile or variability in movement trajectory. To investigate this issue, we applied a quasi-biological minimum-jerk velocity profile (excluding variability in the
movement trajectory as an influencing factor of MI) to motion of a humanoid robot, which was observed by subjects performing congruent or incongruent arm movements. The increase in variability in subjects’ movements occurred both for the observation of a human agent and for the robot performing incongruent movements, suggesting that an artificial human-like movement velocity profile is sufficient to facilitate the perception of humanoid robots as interaction partners.

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

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