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Examining the legibility of humanoid robot arm movements in a pointing task

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Human–robot interaction requires robots whose actions are legible, allowing humans to interpret, predict, and feel safe around them. This study investigates the legibility of humanoid robot arm movements in a pointing task, aiming to understand how humans predict robot intentions from truncated movements and bodily cues. We designed an experiment using the NICO humanoid robot, where participants observed its arm movements towards targets on a touchscreen. Robot cues varied across conditions: gaze, pointing, and pointing with congruent or incongruent gaze. Arm trajectories were stopped at 60\% or 80\% of their full length, and participants predicted the final target. We tested the multimodal superiority and ocular primacy hypotheses, both of which were supported by the experiment.

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Authors: FARIČ, Ana; Dr LÚČNY, Andrej (Comenius University); Dr MAZZOLA, Carlo; Ms HORNÁČKOVÁ, Hana (Comenius University); Prof. FARKAŠ, Igor; Dr MALINOVSKÁ, Kristína; Dr ANTONJ, Matilde; Dr VAVRECKA, Michal

Presenter: Ms HORNÁČKOVÁ, Hana (Comenius University)

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