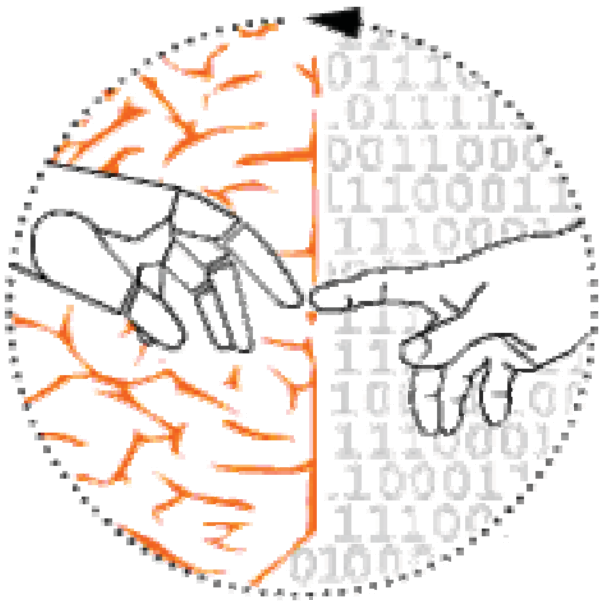

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Exploring the Rhythmic Nature of Handshake Movement and a Turing-like test

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We design a Turing-like handshake test, for motor intelligence, administered through a telerobotic system. Instead of asking the subject whether the other party is a person or a computer program, we employ a forced-choice method that asks which of two systems is more human-like. By comparing the developed model with a weighted sum of human and artificial systems, we construct a psychometric curve and extract a quantitative grade for the artificial system in terms of similarity to the human handshake. The test subject is engaged in a task of holding a robotic stick and interacting with another party (human, artificial, or a linear combination of the two).

In this poster we present initial results on the rhythmic nature of the human handshake. Human movements can be classified as rhythmic or discrete. Participants (3 young adults) were asked to perform handshake motions when holding the stylus of a Phantom® haptic device which enabled us to track their position. We analyzed their motions in terms of smoothness, harmonicity, frequency and amplitude. We found that the handshake motion is rhythmic in its nature rather than discrete.

Based on these results, we hypothesized that a robotic handshake model which implements the rhythmic characteristic of the motion would be perceived as more human-like than a model that lacks this characteristic.

Our preliminary results suggest that a mechanical model of a handshake that includes a rhythmic power source is perceived as more human-like than a passive model that lacks it.

Further iterations of the Turing-like handshake test are expected to unravel additional basic properties of human perception and motor interaction, with important implications for medical diagnostics, artificial limbs, telerobotics and medical robotics.

We intend to organize a computer tournament during one of the next Annual BGU Computational Motor Control Workshop to compete on the best simulated handshake and the best discrimination program to develop a controller for the PHANTOM® Desktop™ that will generate handshake behavior indistinguishable from that of the human handshake.

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