

Decomposing biological motion: A framework for analysis and synthesis of human gait patterns

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Biological motion contains information about the identity of an agent as well as about his or her actions, intentions, and emotions. The human visual system is highly sensitive to biological motion and capable of extracting socially relevant information from it. Here we investigate the question of how such information is encoded in biological motion patterns and how such information can be retrieved. A framework is developed that transforms biological motion into a representation allowing for analysis using linear methods from statistics and pattern recognition. Using gender classification as an example, simple classifiers are constructed and compared to psychophysical data from human observers. The analysis reveals that the dynamic part of the motion contains more information about gender than motion-mediated structural cues. The proposed framework can be used not only for analysis of biological motion but also to synthesize new motion patterns. A simple motion modeler is presented that can be used to visualize and exaggerate the differences in male and female walking patterns.