

Computational Models of Sensorimotor Biomechanisms

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Our goal is to create useful computational models of how humans move and physically interact with their environment. The focus is not on black-box models of movement data. Rather, it is on modeling the underlying system itself, as a biological machine: the motors(muscles), structures (skeleton and connective tissues), sensors (mechanoreceptors), and software (neural control). By modeling the underlying sensorimotor system we hope to achieve better generalization and gain fundamental insights into biological principles. I will describe our recent progress in this area. This includes a new appreciation for the role of muscle mass in musculoskeletal dynamics, a new model for the behavior of active muscle, and robust algorithms for simulating realistically complex biomechanical systems. The talk will describe examples of modeling the human hand and eye, and applications in computer graphics, robotics, and human health.