The Chinese University of Hong Kong
Department of Statistics

Seminar

Computational Approach in Sensorimotor Control

By
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Abstract

In recent years computational approaches have been gaining popularity in the area of psychology. As a particular area of psychology, sensorimotor control studies focus on investigating how humans perceive relevant sensory information and control their motor actions. Theories from optimal control and Bayesian statistics have been successfully applied in explaining various phenomena in sensorimotor control. In the present talk, I will first introduce the concepts of motor learning and motor control. Centering on the application of Bayesian theory, I will then review some of my finished studies. The research questions explored include: how does uncertainty in the sensory feedback and state estimation impact the speed of human motor adaptation? How are multimodal sensory inputs optimally combined statistically during the process of maintaining an upright posture? How can causal inference, a cognitive concept, be modeled as a generative model? Is there an optimal error size to facilitate learning? I wish to convince you that these seemingly diverse questions in psychology can be better understood with computational models based on Bayesian statistics.

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References:

Wei, K., Kording, K. (2010). Uncertainty in state estimate and sensory feedback determines the rate of motor learning. Frontiers in Computational Neuroscience. 4,11.

Ronsse, R., Wei, K., Sternad, D. (2010): Optimal feedback control of rhythmic movements. Journal of Neurophysiology. doi: 10.1152/jn.00600.2009

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