Sandeep Robert Datta

Just doing what I'm doing: the role of dopamine in structuring spontaneous behavior

The Datta lab studies how natural behavior supports cognition. Here we describe a method that combines 3D machine vision with unsupervised machine learning, which we call Motion Sequencing (MoSeq). Using MoSeq we have discovered that mouse behavior can be segmented into a fundamental set of components that we call “behavioral syllables.” Each behavioral syllable is a brief and well-defined motif of 3D behavior that the brain places in into specific sequences via definable transition statistics (or behavioral “grammar”) to flexibly create complex patterns of action. By combining MoSeq with in vivo imaging of neural circuits in behaving animals, we have identified context-dependent neural correlates for the sub-second structure of beahvior, and have identified the dorsolateral striatum as a key node for implementing naturalistic behavioral sequences. Striatal activity is deeply influenced by dopamine, and so we have recently extended our work to ask whether dopamine similarly plays a role in shaping spontaneous behavior. By performing recordings of endogenous dopamine and by deploying a novel closed-loop version of MoSeq we have demonstrated that dopamine specifies how often a given syllable is used over long timescales, and the specific order in which those syllables occur over short timescales. These experiments reveal an unexpected and pervasive role for dopamine in structuring spontaneous behavior in the absence of a task or reward.

The Psychology Department in the College of Science Colloquium Series

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Thursday, October 14, 2021

Time: 5:00PM
Place: 320BK

Zoom Link:

https://northeastern.zoom.us/meeting/register/tJEkcuGoqzktGtLzphZ2nJ2iAAjwm-

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