Session 1　10:20 – 10:40

[Presenter]

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[Title]

Experimental and theoretical investigation of Bayesian inference across multiple layers in somatosensory cortex

[Abstract]

Bayesian brain theory has been a useful framework for understanding a wide range of sensorimotor behaviors. It hypothesizes that actions are guided by interactions between experience-based priors and current sensory evidence. However, whether and how the brain achieves Bayesian computation remains largely unknown.

To investigate the neural mechanisms of Bayesian-like behaviors on the basis of the multi-layer structure of the cerebral cortex, we designed and made an active-lever pull/push setup for mice. The training paradigms are designed to involve uncertainty so that the inference of certain hidden variable is necessary when the animals try to achieve the task. We set two ways to involve the uncertainty to the task by (1) introducing a noise to the initial guiding movement of the lever in a pull/push distinguish task; (2) probabilistically changing the resistance of operating the lever trial-wisely.

We assume that the neural activities in sensory cortex will serve as the basis of Bayesian inferences, and neural activities from different cortical layers may play as different components in a Bayesian model. Therefore, after taking calcium imaging of neural activities across multiple layers of forelimb somatosensory cortex via a prism probe, probabilistic population decoding will be applied on the neural data to verify the hypothetical model.