

IRCN Seminar IRCN セミナーのご案内

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Seeing structures through the noise

Monday, March 4, 2019

3:00 pm - 4:00 pm

IRCN Seminar Room

13F Experimental Research Building, Faculty of Medicine, Hongo Campus

Abstract:

Utilizing the statistical structure in sensory inputs and a proper generative model allows animals to make efficient perceptual decisions and to discover latent causes of an environment, facing with various uncertainties. Similarly, utilizing the statistical structure of brain imaging data and its generative model is critical for understanding brain activity. In this talk, I will demonstrate how ignoring the factors that generate structured noise in neural data analysis can lead to an erroneous discovery of representational similarity structure, and present an alternative Bayesian framework for representational similarity analysis that takes structured noise properly into account. I will then show that the same Bayesian principle can be used to optimally separate neural signals from non-neural artifacts using multi-echo fMRI, without employing ad-hoc dimension reduction tools. The common starting point of these works is a proper generative model. However, the brain frequently needs to learn to build generative models for unknown environments, and researchers also face domains where a good generative model is not available. I will present some preliminary work on learning a nonlinear generative model of fMRI data with deep neural networks. Finally, using time perception as an example, I will discuss when the brain fails to learn a correct generative model and shed some light on future research of human learning.

For more information お問い合わせ:

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