PiAI Seminar Series: Physics informed AI in Plasma Science
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Web Seminar

Toward Data-driven Brain Science

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Classically, theorists of the brain sought abstraction of brain mechanisms and were content with qualitative reproduction of typical observations reported in neuroscience literature. A more recent breed of computational neuroscientists, however, try to utilize massive experimental data directly for constructing models, validating them, and further deriving new models and hypotheses. In this talk, I will introduce our efforts in creating learning models from animal behavioral data and decoding information contents in neuroimaging data. I will also discuss what approaches and resources are required to advance data-driven brain science.

References:

Ito M, Doya K (2015). Parallel representation of value-based and finite state-based strategies in the ventral and dorsal striatum. PLoS Computational Biology, 11, e1004540. https://doi.org/10.1371/journal.pcbi.1004540

Funamizu A, Kuhn B, Doya K (2016). Neural substrate of dynamic Bayesian inference in the cerebral cortex. Nature Neuroscience 19, 1682-1689. https://doi.org/10.1038/nn.4390

Miyazaki K, Miyazaki KW, Yamanaka A, Tokuda T, Tanaka KF, Doya K (2018). Reward probability and timing uncertainty alter the effect of dorsal raphe serotonin neurons on patience. Nature Communications, 9, 2048. https://doi.org/10.1038/s41467-018-04496-y