

知の物理学研究センター / Institute for Physics of Intelligence

ipi seminar

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「Renormalization, Thermodynamics, and Feature Extraction of Machine Learning」

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東京大学本郷キャンパス理学部1号館9階 913号室

Recently the machine learning has been applied to data analysis in various research fields. The methods of the machine learning are roughly classified by supervised learning and unsupervised learning.

In the latter we train a machine so that it can reconstruct given dataset, then the machine seems to extract features of the dataset.

Since extraction of feature resembles the coarse-graining, many researchers naively consider it is closely related to the renormalization.

In this talk, however, I'd like to show that the feature extraction of the machine learning has a clear difference from the renormalization.

For the training, we use the images of the spin configurations in Ising model, since we know well about its renormalization group (RG) flow.

We generate the flow of images by iterative reconstructions of the machine, and compare it with the RG flow. As a result, we find the reconstruction flow shows some relations with renormalization and thermodynamic property.