

Day 4

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Title: How to perform iterative-structured machine learning by quantum annealer

Abstract:

In this talk, we demonstrate iterative-structured machine learning such as deep learning by using the D-Wave Advantage.

As is well known, the D-Wave quantum annealer outputs many realizations of the spin configurations following the Gibbs-Boltzmann distribution.

Thus D-Wave quantum annealer is expected to be used in the Boltzmann machine learning and related models to compute the expectation at each epoch during the learning process.

However, due to the bottleneck to newly input the parameters on the quantum processing unit, the efficient implementation is not demonstrated for deep architecture.

In particular, the sampling conditioned on the visible variables demands repetition of the sampling by changing the parameters of the machine learning model.

In this talk, we propose a new algorithm to perform the efficient Boltzmann machine learning including the hidden units and generalization to the iterated-structured machine learning such as deep learning.