Tohoku Univ. Technology

Solution for 3rd order and higher nonlinear transformation, etc. by quantum annealing

Possible to solve complex optimization problems with current quantum annealing

Overview

In quantum annealer, the optimization problems are solved by finding the minimum value of the cost function with a form of quadratic function because the current quantum annealer uses interactions only between neighboring quantum bits.

The technology in this invention is capable to handle equations containing 3rd order and higher terms, including nonlinear transformations.

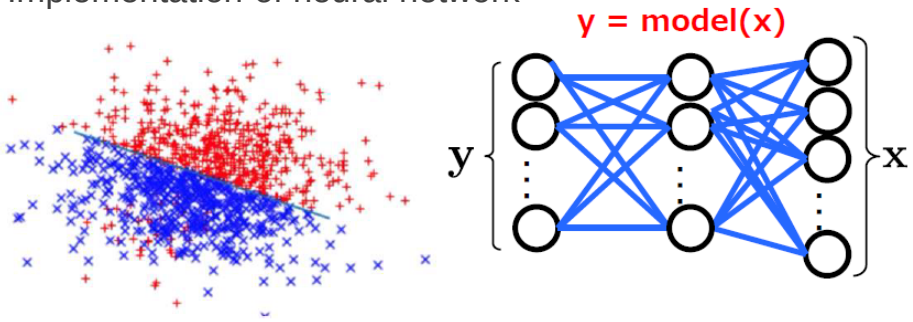
We propose a potential application to neural networks to find an optimal binary neural network, which has low power consumption in comparison to the ordinary neural network.

Product Application

AI, artificial intelligence, machine learning, deep learning, optimization problem, neural network, quantum annealing, quantum computer, etc.

Working Example

Implementation of neural network



Hamiltonian for Ising model

$$\hat{H}_0 = -\sum_{i \neq j} J_{ij} \hat{\sigma}_i^z \hat{\sigma}_j^z - \sum_{i=1}^{N} h_i \hat{\sigma}_i^z$$

IP Data

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