Day 4 (Poster F)

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Title:Solving slot placement problems using an Ising machine with the initial process and its evaluation

Abstract:
In recent years, various Ising machines have been developed to solve combinatorial optimization problems by finding the ground state of their representation as an Ising model.
A combinatorial optimization problem is a problem of searching for a combination of variables that maximizes or minimizes an objective function under certain constraints.
As the number of variables increases, the amount of computation may also increase exponentially.
By using an Ising machine, it is possible to obtain a quasi-optimal solution with high speed and high accuracy.
Here, we propose an initial process for efficiently solving a combinatorial optimization problem using an Ising machine.
Firstly, we give initial spin values that give a relatively good solution to the combinatorial optimization problem, which satisfies the given constraints.
Then, the annealing process is executed by an Ising machine, and the solution obtained by the annealing process is corrected to satisfy the constraints.
Particularly, we propose a pair-wise swap method and a random-swap method as an initial process.
We have applied the proposed method to the slot placement problem and evaluated the result of experiments using an Ising machine, a Digital Annealer, and it is confirmed that the solution is improved by applying the initial process.

This work was done in collaboration with Keisuke Fukada, Matthieu Parizy, Yoshinori Tomita, and Nozomu Togawa.