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Type: **Contributed Talk**

Quantum annealing for sample-efficient reinforcement learning

Wednesday, February 7, 2024 2:30 PM (30 minutes)

Free energy-based reinforcement learning (FERL) using clamped quantum Boltzmann machines (QBM) has demonstrated remarkable improvements in learning efficiency, surpassing classical Q-learning algorithms by orders of magnitude. This work extends the FERL approach to multi-dimensional optimisation problems and eliminates the restriction to discrete action-space environments, opening doors for a broader range of real-world applications. We will discuss the results obtained with quantum annealing, employing both a simulator and D-Wave quantum annealing hardware, as well as a comparison to classical RL methods. We will cover how the algorithms are evaluated for control problems at CERN, such as the AWAKE electron beam line, and for classical RL benchmarks of varying degree of complexity.

Possible contributed talk

Yes

Are you a student?

No

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