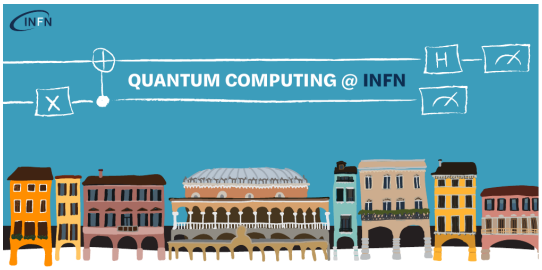

Contribution ID: **2** Type: **not specified**

Quantum diffusion models for quantum data learning

Tuesday, 29 October 2024 17:40 (20 minutes)

Quantum machine learning models based on parameterized quantum circuits have attracted significant attention as early applications for current noisy quantum processors. While the advantage of such algorithms over classical counterparts in practical learning tasks is yet to be demonstrated, learning distributions generated by quantum systems, which are inherently quantum, is a promising avenue for exploration. We propose a quantum version of a generative diffusion model. In this algorithm, artificial neural networks are replaced with parameterized quantum circuits, in order to directly generate quantum states. We present both a full quantum and a latent quantum version of the algorithm; we also present a conditioned version of these models. Models' performance have been evaluated using quantitative metrics complemented by qualitative assessments. An implementation of a simplified version of the algorithm has been executed on real NISQ quantum hardware.

Sessione

Quantum Machine Learning

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