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Quantum Model for Machine Learning Applications

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The field of machine learning has been revolutionized by the recent improvements in the training of deep networks. Their architecture is based on a set of stacked layers of simpler modules. One of the most successful building blocks, known as a restricted Boltzmann machine, is an energetic model based on the classical Ising Hamiltonian. In our work, we investigate the benefits of quantum effects on the learning capacity of Boltzmann machines by extending its underlying Hamiltonian with a transverse field. For this purpose, we employ exact and stochastic training procedures on data sets with physical origins.

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