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Quantum-inspired Tensor Network machine learning on high-energy physics data

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Tensor Networks are mathematical representations that have been invented to investigate quantum many-body systems on classical computers.
Recently it has been shown that quantum-inspired Tensor Networks can be applied to solve machine learning tasks.
Due to their quantum nature, Tensor Networks allow to easily compute quantities like correlations and entropy in order to gain insight into the learning data.
In this contribution a study of Tensor Network machine learning applied to high-energy physics data is presented.
The machine learning task considered is the identification of the charge of the b-quark that initiated a hadronic jet (b-jet vs $\bar{b}$-jet).
Open data obtained from the LHCb experiment simulation have been used for the training and validation.
In particular the identification performance of different algorithms, Tensor Network and Deep Neural Network, are compared.
A discussion on the prediction time, a critical point for real-time applications, is also presented.

I read the instructions

Secondary track (number)

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