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Quantum Machine Learning for b-jet identification

Saturday, 9 July 2022 14:30 (15 minutes)

Machine Learning algorithms are playing a fundamental role in solving High Energy Physics tasks. In particular, the classification of hadronic jets at the Large Hadron Collider is suited for such types of algorithms, and despite the great effort that has been put in place to tackle such a classification task, there is room for improvement. In this context, Quantum Machine Learning is a new methodology that takes advantage of the intrinsic properties of quantum computation (e.g. entanglement between qubits) to possibly improve the performance of a classification task. In this contribution, a new study of Quantum Machine Learning applied to jet identification is presented. Namely, a Variational Quantum Classifier is trained and evaluated on fully simulated data of the LHCb experiment, in order to identify jets containing a hadron formed by a b or $\bar{b}$ quark at the moment of production. The jet identification performance of the quantum classifier is compared with a Deep Neural Network using the same input features.

In-person participation

Yes

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