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Parameterized Quantum Supervised Learning Classifiers

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Recent years witnessed various supervised learning frameworks relying on trainable quantum circuits as a result of advancement of quantum machine learning. The variational quantum classifier classifies data using a Variational Quantum Circuit (VQC) with an ansatz. The primary goal of the quantum supervised learning classifiers is to use the quantum feature map to transform data from distinct classes to different places in Hilbert space. However, it is not feasible to do feature selection beforehand, and for high-dimensional data using specific features to embed in the ansatz leads to data loss and error in classification. Hence, often data reduction technique like Shannon map is used on the data before uploading it to the quantum circuit. To obviate the data reduction before feeding to the circuit, dense parameterized quantum circuits with lesser number trainable parameters have been proposed without compromising the classification accuracy. The proposed quantum supervised learning framework is an improvement over established work on supervised quantum classifications. To show the effectiveness of the proposed densed quantum circuit, extensive experiments have been performed on IRIS data set and results show that it outperforms the previous quantum supervised classification frameworks in terms of classifications accuracy and complexity of the frameworks.

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