Quantum AI for Alzheimer's disease early screening

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Alzheimer's disease is a neurodegenerative brain disorder that mostly affects elderly people, causing important cognitive impairments [1]. The analysis of handwriting can be effective for diagnosing [2]. The DARWIN (Diagnosis AlzheimeR WIth haNdwriting) dataset contains handwriting samples from people affected by Alzheimer's disease and a group of healthy people [3]. Here we use this dataset to test kernel methods for classification task and compare their performances with the ones obtained via quantum machine learning methods. We find that quantum and classical algorithms achieve similar performances and in some cases quantum methods perform even better.
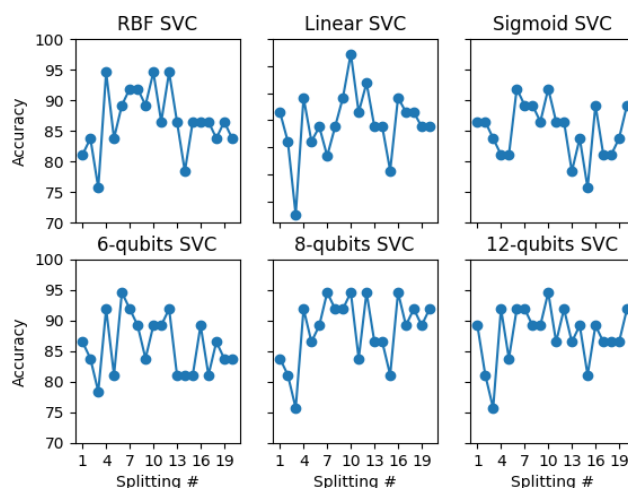
Figures

Figure 1: Accuracies (in percentage) vs. splittings of the dataset in training and test set in classical and quantum SVC models.
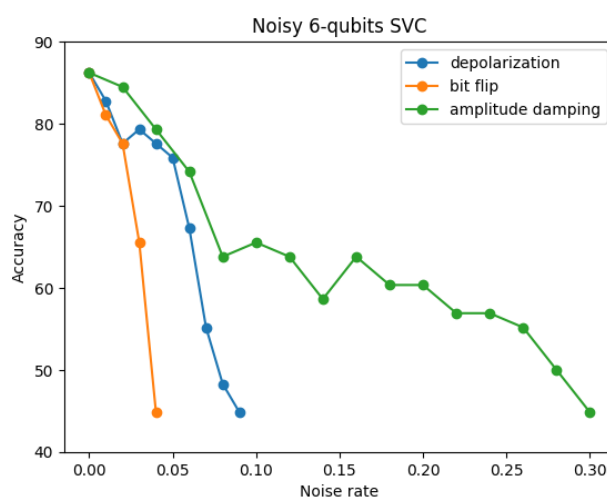

Figure 2: Accuracies (in percentage) of 6-qubits SVC as noise rate increases in the depolarizing, bit-flip and amplitude damping noise models.

References

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[3] Cilia, N.D., De Gregorio, G., De Stefano, C., Fontanella, F., Marcelli, A., Parziale, A.: Diagnosing alzheimer's disease from on-line handwriting: A novel dataset and performance benchmarking.