Contribution ID: 50

Variational Quantum Algorithms

Variational Quantum Algorithms are a class of hybrid quantum-classical algorithms. This technique makes use of a parametric quantum circuit that is executed on quantum device as an ansatz whose parameters are optimized using a classical computer based on the measurement outcome of the quantum device. Running the feedback loop between the classical computer and the quantum coprocessor until convergence, this approach allows for tackling a variety of problems ranging from combinatorial optimization tasks to approximating the ground state of a given Hamiltonian.

A central part of Variational Quantum Algorithms is the optimization of the parameters in the parametric circuit. In this project we will take a closer look at this aspect. We will implement a simple Variational Quantum Algorithm using the quantum Ising model as a benchmark model and explore its performance. In particular, we will examine how various factors impact the optimization procedure. If time permits, we are going to benchmark the simulations on real quantum hardware.

Field

B6: Computing

DESY Place

Zeuthen

DESY Division

FH

DESY Group

CQTA

Special Qualifications:

Python programming, experience in Quantum Computing would be a plus

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