Open Project (MA, Hiwi)
Robust quantum machine learning

Description:

Quantum computers promise to revolutionize computing by efficiently solving previously intractable problems. Recent years have seen tremendous progress on both the experimental realization of quantum computing devices as well as the development and implementation of quantum algorithms. Quantum machine learning (QML) refers to the field at the intersection of quantum computing and machine learning (ML) and it is a promising branch of quantum computing which may lead to computational advantages over classical algorithms in the near term.

Robustness of ML models against data perturbations is an increasingly important property, especially when operating on real-world data. While being well-researched in classical ML and control theory, robustness is still poorly understood in QML.

In this project, you will analyze the robustness of QML models based on theoretical tools such as Lipschitz bounds. Further, the goal is to verify these theoretical results empirically in simulation and on a real quantum computer.

Prerequisites:

- Strong background in control theory and mathematics
- Interest in theoretical problems
- **Preliminaries:** basic knowledge of machine learning will be beneficial

Supervisor:

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Area:

Quantum computing
Machine learning
Robustness

Properties:

Type: **MA, Hiwi**

30% literature
30% theory
40% implementation

Beginning:

now

Weitere Informationen: www.ist.uni-stuttgart.de/lehre/bama

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