Contribution ID: **79** Type: **not specified**

Quantum Machine Learning: interplay between implicit and explicit quantum models

Friday, 29 March 2024 14:00 (1 hour)

Quantum machine learning, promising for quantum computers, explores implicit models utilizing quantum kernel methods or explicit models, known as quantum circuit learning. While implicit models often yield lower training errors, they face linear prediction time scaling with data size, potentially overfitting. Explicit models predict in constant time but encounter challenges with optimization, notably the barren plateau phenomenon. This study introduces a quantum-classical hybrid algorithm to convert implicit models efficiently to explicit ones. The resulting explicit model matches implicit model performance but requires fewer quantum circuit executions for inference. In classification tasks using MNISQ and VQE-generated datasets, our explicit model shows comparable generalization to implicit models with reduced computational costs. Our algorithm accelerates prediction for implicit models and aids in constructing high-performance explicit models, notably addressing the barren plateau phenomenon. We also discuss our efforts in developing infrastructure for quantum machine learning, including datasets, libraries, and simulators.

Primary author: Prof. FUJII, Keisuke (Osaka University)

Presenter: Prof. FUJII, Keisuke (Osaka University)

Session Classification: Invited talks

Track Classification: Invited talk