Unlocking the Potential of Quantum-Classical Processing

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Abstract

In recent years, it has become increasingly clear that realizing the potential of Quantum Computers would require tight quantum-classical integration, in particular to overcome the high error rate in various manners. In this talk, we will dive into the considerations for building quantum-classical architectures and present the latest progress and developments in the field. We will present our latest results from Google-Quantum Machine's collaboration to perform long range quantum teleportation, demonstrating the need of and the advantage of tight, real-time quantum-classical integration. We will discuss the importance of defining quantum-classical processing requirements and benchmarks. Finally, we will introduce NVIDIA-Quantum Machine's DGX Quantum, an architecture built to scale up ultra-low latency quantum-classical machines towards practical implementations of quantum error correction.