Quantum Computing for Signal Processing and Machine Learning

ICASSP 2019 Special Session
https://2019.ieeeicassp.org

SCOPE AND MOTIVATION

Quantum computing deals with a new and interdisciplinary field at the intersection of physics, mathematics, computer science, signal processing and electrical engineering. As quantum computers are believed to be capable of solving some problems that are intractable for today's computers, the question of quantum supremacy must be investigated not only from a mathematical and theoretical point of view, but also considering crucial applications in a "connected world" of big data associated with 5G, IoT, cloud-based data processing, social media, and so on.

The aim of this Special Session is to allow deep coverage of new and original research on these topics and to raise important problems that can benefit from quantum algorithms and architectures, focusing in particular on signal processing applications. Nonetheless, research interest is growing on the interplay between quantum information processing and machine learning, two areas that are embracing rapid, exciting advancements. The exchange of ideas, methods, and techniques among different communities will help to build beneficial connections and provide fundamentally innovative ideas to solve core problems in all of these fields. Overall, this Special Session is organized with the aim to foster collaboration among scientists and to promote research in the exciting new direction of quantum signal processing.

TOPICS

The topics of interest to be covered by this Special Session include, but are not limited to:

- Quantum algorithms for signal processing
- Quantum machine learning
- Quantum information theory
- Quantum cryptography and privacy-preserving data mining
- Quantum key distribution and secure direct quantum communications
- Quantum gate arrays for deep learning
- Quantum annealing for data processing and optimization
- Theoretical aspects of quantization in quantum computers and neural networks
- Quantum computing in big data analytics
- Fault tolerant quantum computers for signal processing and communications
- Quantum error correction codes, quantum stabilizer codes, quantum topological codes
- Quantum communications and quantum detections
- Quantum computing for data modeling in telecommunications

IMPORTANT DATES

- Paper submission deadline: **October 29, 2018**
- Notification of paper acceptance: February 1, 2019
- Submission of final paper deadline: February 18, 2019
- Conference dates: May 12-17, 2019

ORGANIZERS

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