

Title:

Machine Learning and Quantum Computation

Abstract:

In the past few years, a rapid growth of interest in machine learning has emerged from academia to industry. We believe that machine learning will play a major role in all areas of future scientific research. On the other way, Quantum computation is another hot topic which brings a tremendous amount of impact and challenge to classic computing. How to combine quantum computing and machine learning to solve classic problems or quantum problem has recently becomes a new interesting research direction.

Scope and Topics:

This workshop brings together experts from a variety of backgrounds to discuss the present and future developments of machine learning and quantum computation, and welcomes to present the original papers among classical machine learning, quantum cryptography and algorithm, and the combination of quantum computation and machine learning. The topics includes but not limited to:

- ✧ New approaches and new applications for supervised learning, unsupervised Learning and reinforcement learning.
- ✧ The theory or application of deep learning, including deep neural networks (DNN), the restricted Boltzmann machine (RBM), etc.
- ✧ Quantum cryptography and quantum communication, including QKD, QSS, QKA, QSDC, etc.
- ✧ Quantum secure multiparty computation, such as private comparison, query, voting, set computation, etc.
- ✧ Applying machine learning techniques to study quantum physics problems, such as to classify phases of matter, to solve quantum many-body problems, and to design desired quantum material and quantum circuit.
- ✧ Applying the methods and theories developed in quantum physics to explore new machine learning paradigm, such as quantum-inspired learning algorithms, quantum machine learning, quantum deep learning, Quantum reinforcement learning, and the conversation among deep learning, renormalization group, and holographic duality; the theory of neural network dynamics and phase transitions.

Program Committee Chairs:

Wenjie Liu, Nanjing University of Information Science and Technology, China
<http://web2.nuist.edu.cn:8080/jszy/Professor.aspx?id=844>

He is now an associate professor of Computer Science and Technology at Nanjing University of Information Science and Technology, China. He received his Bachelor (HZAU, China, 1997), Master (WHU, China, 2004), Ph.D. (SEU, 2011). His research interests include quantum machine learning, quantum secure multi-party computation, quantum cryptography communication, etc. In recent five years, he has published 20 SCI-indexed Articles, one teaching material, and received one China NSF Grant, one Jiangsu NSF Grant, and one Jiangsu “Six Peak project” Grant.

Gonglin Yuan, Ph.D., Professor, Guangxi University, Guilin

<http://210.36.22.97/tcms/teachInfo!queryTeachInfoById.action?gh=FCEACE35118B11E69C550050569949B5>

Prof. Yuan received the Ph.D. degrees in computer science from from the East China University of Science and Technology, Shanghai, China, and worked as a professor and the PhD supervisor at Guangxi University. His area of interest includes optimization algorithms, nonlinear analysis, regression analysis mathematical programming, optimization methods for practical models, etc. In recent several years, he has published 34 SCI-indexed Articles, two monographes and one teaching material, and received two China NSD Grant, one Guangxi Key NSF Grant, and one Guangxi Excellent Talents NSF Grant.

Lianhua Chi, Dr., IBM Research Center, Australia

Lianhua Chi received the dual Ph.D. degrees in computer science from the University of Technology Sydney, Broadway, NSW, Australia, and the Huazhong University of Science and Technology, Wuhan, China, in 2015. She is currently an advanced Researcher in IBM Research Center of Australia. Her current research interests focus on cognitive data analytics, in particular on big data analysis in social media, Watson Education and Watson Health.

Dr. Chi was a recipient of the Best Paper Award in PAKDD in 2013. In 2016, she was named among the “Top 200 Most Qualified Young Researchers in Computer Science and Mathematics” globally by the Scientific Committee of the Heidelberg Laureate Forum Foundation (HLFF). In 2017, she was selected as one of 100 outstanding Young Global Changers to attend the Think 20 Summit – GLOBAL SOLUTIONS (T20).

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