Optimizing the structure of tree tensor network for quantum generative modeling using mutual information-based approach

Wednesday, 27 March 2024 10:00 (20 minutes)

Generative modeling is a crucial task in the field of machine learning. Recently, there have been several proposals for generative models on quantum devices. We can efficiently optimize generative models defined by tensor network states, but their performance largely depends on the geometrical structure of the tensor network. To tackle this issue, we have proposed an optimization method for the network structure in the tree tensor network class, based on the least mutual information principle. Generative modeling with an optimized network structure has better performance than a fixed network structure. Moreover, by embedding data dependencies into the tree structure based on the least mutual information principle, we can geometrically represent the correlations in the data.

Primary author: Prof. HARADA, Kenji (Graduate School of Informatics, Kyoto University)

Co-authors: Prof. OKUBO, Tsuyoshi (Institute for Physics of Intelligence, University of Tokyo); Prof. KAWASHIMA, Naoki (Institute for Solid State Physics, University of Tokyo)

Presenter: Prof. HARADA, Kenji (Graduate School of Informatics, Kyoto University)

Session Classification: Symposia talks

Track Classification: Contributed talk