Contribution ID: **23** Type: **not specified**

Tensor network to learn the wave function of data

Tuesday 16 January 2024 18:00 (45 minutes)

How many different ways are there to handwrite digit 3? To quantify this question imagine extending a dataset of handwritten digits MNIST by sampling additional images until they start repeating. We call the collection of all resulting images of digit 3 the "full set." To study the properties of the full set we introduce a tensor network architecture which simultaneously accomplishes both classification (discrimination) and sampling tasks. Qualitatively, our trained network represents the indicator function of the full set. It therefore can be used to characterize the data itself. We illustrate that by studying the full sets associated with the digits of MNIST. Using quantum mechanical interpretation of our network we characterize the full set by calculating its entanglement entropy. We also study its geometric properties such as mean Hamming distance, effective dimension, and size. The latter answers the question above – the total number of black and white threes written MNIST style is 272.

Presenter: DYMARSKY, Anatoly