Data and quantum advantage: The promise and the gaps in quantum machine learning

M. S. Santhanam

IISER Pune

Quantum computers are expected to provide faster solutions, often called quantum advantage, to a niche set of problems that are known to be intractable in the classical computing paradigm. Hence, there is also considerable expectation that quantum advantage might also help in machine learning tasks. Theoretical research in the last two decades has shown that quantum computers can make significant contribution towards efficient solutions of some machine learning tasks. However, not all quantum machine learning algorithms are known to display the ambitious exponential speed-up over classical algorithms, or where they do they are either restrictive or not easy to implement on a quantum computer. This talk will provide an overview of some problems and promised solutions, and also discuss the gaps between theory and practice. We will also briefly weave some of our results in the discussion.