Quantum Machine Learning

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Abstract

Fuelled by increasing computer power and algorithmic advances, machine learning techniques have become powerful tools for finding patterns in data. Since quantum systems produce counter-intuitive patterns believed not to be efficiently produced by classical systems, it is reasonable to postulate that quantum computers may outperform classical computers on machine learning tasks. The field of quantum machine learning explores how to devise and implement concrete quantum software that offers such advantages. Recent work has made clear that the hardware and software challenges are still considerable but has also opened paths towards solutions.

Introduction

Long before they possessed computers, human beings strove to find patterns in data. Ptolemy fit observations of the motions of the stars to a geocentric model of