

Quantum Computing Applications in Machine Learning

Pat King

PhD

Massachusetts Institute of Technology
77 Massachusetts Avenue, Cambridge, MA 02139, USA

Edward Martin

Dr.

University of Cambridge
The Old Schools, Trinity Ln, Cambridge CB2 1TN, United Kingdom

Chris Carter

Prof.

University of Toronto
27 King's College Cir, Toronto, ON M5S, Canada

Abstract. Quantum computing holds promise to revolutionize the field of machine learning by offering substantial computational speed-ups for complex algorithms. This article explores various quantum algorithms and their potential applications in enhancing machine learning models. The discussion encompasses the challenges and opportunities in integrating quantum computing with current machine learning frameworks. Preliminary results suggest that quantum-enhanced models may outperform classical approaches in specific tasks, albeit with significant implementation challenges remaining.

Keywords: Quantum Computing, Machine Learning, Quantum Algorithms, Computational Speed-up, Quantum Machine Learning

Introduction

Quantum computing represents a groundbreaking advancement in computational capabilities, offering unprecedented speed and efficiency for solving complex problems. This article focuses on the intersection of quantum computing and machine learning, two of the most dynamic fields in computer science today. By leveraging quantum algorithms, machine learning models can potentially achieve superior performance, particularly in tasks involving large datasets and complex computations. This paper provides an overview of current research in quantum machine learning, highlighting both the potential benefits and the technological hurdles that must be overcome.

This is a preliminary version. To read the full version of the article, please purchase a subscription.

References

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