

Preface

The integration of quantum computing and artificial intelligence marks a transformative era in computational science, offering powerful solutions to complex challenges across diverse domains. *Hybrid Algorithms for Quantum Computing and Artificial Intelligence* provides an in-depth exploration of hybrid approaches that combine the strengths of quantum and classical computing. By leveraging quantum mechanics' unique properties, such as superposition and entanglement, alongside the proven efficiency of classical methods, these algorithms unlock new possibilities in optimization, machine learning, cryptography, and beyond. This book offers a comprehensive framework, guiding readers from foundational concepts to advanced applications, such as quantum neural networks and variational algorithms. Real-world case studies demonstrate the practical impact of hybrid algorithms in sectors like supply chain management, energy distribution, and drug discovery. Designed for students, researchers, and professionals, this work balances theoretical insights with practical perspectives, making cutting-edge advancements accessible to a broad audience. As quantum technology continues to evolve, the book underscores the growing potential of hybrid systems to address increasingly complex problems, driving innovation and efficiency in science, industry, and society. By bridging classical and quantum paradigms, this book aims to inspire further research and real-world implementation, contributing to advancements that redefine the limits of computational possibilities.