A Survey Of Quantum Computing For Finance

Sitharama S. Iyengar, Mario Mastriani, KJ Latesh Kumar

**Quantum Machine Learning and Optimisation in Finance** Antonio Jacquier, Oleksiy Kondratyev, Alexander Lipton, Marcos Lopez de Prado, 2022-10-31

Learn the principles of quantum machine learning and how to apply them. While focus is on financial use cases, all the methods and techniques are transferable to other fields. Purchase of Print or Kindle includes a free eBook in PDF

Key Features
- Discover how to solve optimisation problems on quantum computers that can provide a speedup edge over classical methods.
- Use methods of analogue and digital quantum computing to build powerful generative models.
- Create the latest algorithms that work on Noisy Intermediate-Scale Quantum (NISQ) computers.

Book Description
With recent advances in quantum computing technology, we finally reached the era of Noisy Intermediate-Scale Quantum (NISQ) computing. NISQ-era quantum computers are powerful enough to test quantum computing algorithms and solve hard real-world problems faster than classical hardware. Speedup is so important in financial applications, ranging from analysing huge amounts of customer data to high frequency trading. This is where quantum computing can give you the edge.

Quantum Machine Learning and Optimisation in Finance shows you how to create hybrid quantum-classical machine learning and optimisation models that can harness the power of NISQ hardware. This book will take you through the real-world productive applications of quantum computing. The book explores the main quantum computing algorithms implementable on existing NISQ devices and highlights a range of financial applications that can benefit from this new quantum computing paradigm. This book will help you be one of the first in the finance industry to use quantum machine learning models to solve classically hard real-world problems. We may have moved past the point of quantum computing supremacy, but our quest for establishing quantum computing advantage has just begun! What you will learn
- Train parameterised quantum circuits as generative models that excel on NISQ hardware
- Solve hard optimisation problems
- Apply quantum boosting to financial applications
- Learn how the variational quantum eigensolver and the quantum approximate optimisation algorithms work
- Analyse the latest algorithms from quantum kernels to quantum semidefinite programming
- Apply quantum neural networks to credit approvals

Who this book is for
This book is for Quants and developers, data scientists, researchers, and students in quantitative finance. Although the focus is on financial use cases, all the methods and techniques are transferable to other areas.

*Applications of Quantum Computers in Financial Markets* Pooyan Ghamari, 2023-03-14

The ebook Applications of...
Quantum Computers in Financial Markets by Pooyan Ghamari is a comprehensive guide to the potential applications of quantum computing in the finance industry. The book is organized into nine sections that cover topics such as understanding quantum computing, quantum computing in finance, portfolio optimization, risk management, asset pricing, quantum key distribution, quantum machine learning, challenges and limitations, and regulatory and ethical considerations. In the introduction, the author provides a brief overview of the current state of financial markets and the potential benefits of quantum computing. The first section provides an introduction to quantum mechanics and its relevance to computing, explaining quantum bits (qubits) and quantum gates. The second section explores how quantum computing can be used in financial markets. It provides an overview of the different types of financial applications such as portfolio optimization, risk management, and asset pricing. The following three sections delve into each of these applications in detail. Section three explains portfolio optimization and how quantum computing can be used for it. Section four explains risk management and how quantum computing can be used for it. Section five explains asset pricing and how quantum computing can be used for it. Section six covers quantum key distribution, which is a secure communication method that uses quantum cryptography to ensure data privacy and security in financial transactions. Section seven covers quantum machine learning, which is a subset of machine learning that leverages quantum computing to speed up the training process and enhance the accuracy of machine learning algorithms in finance. Section eight covers the current limitations of quantum computing technology, the challenges of implementing quantum computing in financial markets, and the potential risks associated with it. Section nine covers the regulatory landscape for quantum computing in finance and the ethical considerations associated with its use. The conclusion summarizes the potential benefits and challenges of using quantum computing in finance and discusses future directions for research and development in this area. The references section provides a list of sources used in the ebook, including academic papers, industry reports, and news articles.

Ai & Quantum Computing For Finance & Insurance: Fortunes And Challenges For China And America Lee David Kuo Chuen, Schulte Paul, 2019-04-16 This book offers a framework and analysis for the current technological landscape between the United States and China across the financial and insurance sectors as well as emerging technologies such as AI, Blockchain, Cloud and Data Analytics and Quantum Computing (ABCDQ). Based on original lecture slides used by the authors, the book presents contemporary and critical views of emergent technologies for a wide spectrum of readers from CEOs to university lecturers to students. The narrative aims to help readers upgrade their technology literacy and to overcome the fear of AI posed by our lizard brain.

Financial Modeling Using Quantum Computing Anshul Saxena, Javier Mancilla, Iraitz Montalban, 2023-03 Elevate your problem-solving prowess by using cutting-edge quantum machine learning algorithms in the financial domain. Purchase of the print or Kindle book includes a free PDF eBook. Key Features: Learn to solve financial analysis problems by harnessing
quantum power Unlock the benefits of quantum machine learning and its potential to solve problems Train QML to solve portfolio optimization and risk analytics problems Book Description: Quantum computing has the potential to revolutionize the computing paradigm. By integrating quantum algorithms with artificial intelligence and machine learning, we can harness the power of qubits to deliver comprehensive and optimized solutions for intricate financial problems. This book offers step-by-step guidance on using various quantum algorithm frameworks within a Python environment, enabling you to tackle business challenges in finance. With the use of contrasting solutions from well-known Python libraries with quantum algorithms, you'll discover the advantages of the quantum approach. Focusing on clarity, the authors expertly present complex quantum algorithms in a straightforward, yet comprehensive way. Throughout the book, you'll become adept at working with simple programs illustrating quantum computing principles. Gradually, you'll progress to more sophisticated programs and algorithms that harness the full power of quantum computing. By the end of this book, you'll be able to design, implement and run your own quantum computing programs to turbocharge your financial modelling. What You Will Learn: Examine quantum computing frameworks, models, and techniques Get to grips with QC's impact on financial modelling and simulations Utilize Qiskit and Pennylane for financial analyses Employ renowned NISQ algorithms in model building Discover best practices for QML algorithm Solve data mining issues with QML algorithms Who this book is for: This book is for financial practitioners, quantitative analysts, or developers; looking to bring the power of quantum computing to their organizations. This is an essential resource written for finance professionals, who want to harness the power of quantum computers for solving real-world financial problems. A basic understanding of Python, calculus, linear algebra, and quantum computing is a prerequisite.

Financial Modeling Using Quantum Computing Anshul Saxena, Javier Mancilla, Iraitz Montalban, Christophe Pere, 2023-05-31 Achieve optimized solutions for real-world financial problems using quantum machine learning algorithms Key Features Learn to solve financial analysis problems by harnessing quantum power Unlock the benefits of quantum machine learning and its potential to solve problems Train QML to solve portfolio optimization and risk analytics problems Book Description Quantum computing has the potential to revolutionize the computing paradigm. By integrating quantum algorithms with artificial intelligence and machine learning, we can harness the power of qubits to deliver comprehensive and optimized solutions for intricate financial problems. This book offers step-by-step guidance on using various quantum algorithm frameworks within a Python environment, enabling you to tackle business challenges in finance. With the use of contrasting solutions from well-known Python libraries with quantum algorithms, you'll discover the advantages of the quantum approach. Focusing on clarity, the authors expertly present complex quantum algorithms in a straightforward, yet comprehensive way. Throughout the book, you'll become adept at working with simple programs illustrating quantum computing principles. Gradually, you'll progress to more sophisticated programs and algorithms that harness the full power
of quantum computing. By the end of this book, you’ll be able to design, implement and run your own quantum computing programs to turbocharge your financial modelling. What you will learn Explore framework, model and technique deployed for Quantum Computing Understand the role of QC in financial modeling and simulations Apply Qiskit and Pennylane framework for financial modeling Build and train models using the most well-known NISQ algorithms Explore best practices for writing QML algorithms Use QML algorithms to understand and solve data mining problems Who this book is for This book is for financial practitioners, quantitative analysts, or developers; looking to bring the power of quantum computing to their organizations. This is an essential resource written for finance professionals, who want to harness the power of quantum computers for solving real-world financial problems. A basic understanding of Python, calculus, linear algebra, and quantum computing is a prerequisite.

Quantum Finance Advantage Azhar Ul Haque Sario, 2024-03-21 Introduces groundbreaking applications of quantum algorithms for smarter investment, risk management, and pricing. Quantum Finance Advantage: Harnessing the Power of Quantum Computing for Financial Innovation The world of finance is on the cusp of a revolution driven by quantum computing. Quantum Finance Advantage is your comprehensive guide to this emerging field, exploring the groundbreaking ways quantum algorithms and techniques will reshape investment strategies, risk analysis, fraud detection, and even the pricing of complex financial instruments. Part 1: The Quantum Leap in Finance This opening section establishes the fundamentals. Discover how quantum mechanics differs from classical computing, and the distinct advantages it brings to finance. Learn how quantum optimization promises to solve complex portfolio problems far beyond the limits of traditional models. Explore techniques like Quantum Mean-Variance Optimization and Quantum Risk Parity to achieve unprecedented levels of balanced returns while managing risk. The book even examines how the Black-Litterman model, a cornerstone of investment theory, can be augmented with quantum computing to better reflect investors' unique perspectives. Part 2: Quantum Security in a Complex World Financial markets thrive on trust, and quantum computing introduces powerful tools to combat the rising tide of fraud. Learn how quantum machine learning can identify subtle anomalies in vast datasets, flagging suspicious transactions far faster than traditional methods. Investigate how quantum algorithms turn financial records into complex networks, revealing hidden links within money laundering schemes and other fraudulent operations. Quantum Finance Advantage discusses the cutting-edge use of quantum behavioral profiling to anticipate fraud, along with the vital role of quantum cryptography in protecting financial data in the years ahead. Part 3: The Quantum Edge in Derivatives The complex world of derivatives pricing is ripe for quantum disruption. Discover the power of quantum Monte Carlo simulations for rapid risk assessment of complex financial instruments. Learn how the Quantum Fourier Transform can streamline exotic option pricing. See how quantum machine learning can enhance pricing models, develop innovative hedging strategies, and compute option sensitivities (Greeks) with unprecedented speed and accuracy. Part 4: Shaping the
Future of Finance  The concluding section examines the broader impact of quantum finance. It explores the potential to level the playing field, opening up complex financial strategies once limited to large institutions. Quantum Finance Advantage addresses the risks of systemic instability due to interconnected quantum algorithms, while highlighting the need for new frameworks to manage those risks. Finally, the book considers the ethical considerations surrounding the use of quantum computing, as finance becomes ever more data-driven.

Who Should Read This Book
Finance professionals looking for an edge in the rapidly evolving markets
Technologists interested in the application of quantum computing to real-world problems
Investors seeking to understand how quantum tools may shape financial strategies
Academics and researchers focused on the intersection of finance and quantum technologies

Quantum Finance Advantage prepares you to navigate this transformative landscape, equipping you with the knowledge needed to seize opportunities and manage the challenges of the coming quantum-powered financial era.

Quantum Computing and the Financial System: Spooky Action at a Distance? International Monetary Fund, 2021-03-12
The era of quantum computing is about to begin, with profound implications for the global economy and the financial system. Rapid development of quantum computing brings both benefits and risks. Quantum computers can revolutionize industries and fields that require significant computing power, including modeling financial markets, designing new effective medicines and vaccines, and empowering artificial intelligence, as well as creating a new and secure way of communication (quantum Internet). But they would also crack many of the current encryption algorithms and threaten financial stability by compromising the security of mobile banking, e-commerce, fintech, digital currencies, and Internet information exchange. While the work on quantum-safe encryption is still in progress, financial institutions should take steps now to prepare for the cryptographic transition, by assessing future and retroactive risks from quantum computers, taking an inventory of their cryptographic algorithms (especially public keys), and building cryptographic agility to improve the overall cybersecurity resilience.


MASTERING QUANTUM ANALYSIS FOR FINANCIAL GROWTH Marcel Souza, Unlock the untapped potential of quantum analysis and skyrocket your financial success with this groundbreaking book – MASTERING QUANTUM ANALYSIS FOR FINANCIAL GROWTH In this revolutionary guide, you’ll dive deep into the world of quantum finance and discover how cutting-edge technologies can empower you to make smarter investment decisions. Whether you’re a seasoned investor or a curious beginner, this comprehensive book will equip you with the knowledge and strategies to thrive in the dynamic world...
of quantum analysis. Embrace the power of quantum computing and gain a competitive edge by leveraging its processing capabilities to analyze complex financial data. Learn how to harness quantum algorithms to detect market patterns, forecast trends, and identify lucrative opportunities that traditional methods often overlook. Discover how to decode the language of quantum mechanics and apply its principles to interpret financial markets in a whole new light. This book will demystify the complexities of quantum analysis and present them in a digestible and actionable format, making it accessible to everyone. Learn how to use quantum computing to optimize portfolio management, risk assessment, and asset allocation. By harnessing the power of quantum analysis, you can achieve higher returns and safeguard your investments like never before. Explore the intersection of quantum physics and behavioral finance, gaining insights into human decision-making biases and using this knowledge to your advantage. With a deeper understanding of the psychological factors driving market movements, you’ll be better equipped to navigate market volatility and capitalize on opportunities. Tap into the potential of quantum machine learning and uncover hidden patterns in financial data that can lead to breakthrough investment strategies. By combining quantum computing with machine learning, you’ll be at the forefront of the financial revolution. From cryptocurrency trading to traditional stock markets, MASTERING QUANTUM ANALYSIS FOR FINANCIAL GROWTH covers a wide range of financial instruments, allowing you to apply quantum principles to any investment avenue. Unleash the power of quantum analysis and stay ahead of the curve in the fast-paced world of finance. This book will guide you through the intricate world of quantum finance, providing you with the tools to make informed and profitable decisions. Prepare to revolutionize your investment approach and embark on a journey of financial prosperity with MASTERING QUANTUM ANALYSIS FOR FINANCIAL GROWTH. Embrace the future of finance, where quantum computing meets savvy investment strategies, and unlock the door to limitless opportunities. The potential for financial success is waiting – are you ready to seize it?

Quantum Finance Raymond S. T. Lee, 2019-11-15
With the exponential growth of program trading in the global financial industry, quantum finance and its underlying technologies have become one of the hottest topics in the fintech community. Numerous financial institutions and fund houses around the world require computer professionals with a basic understanding of quantum finance to develop intelligent financial systems. This book presents a selection of the author’s past 15 years’ R&D work and practical implementation of the Quantum Finance Forecast System – which integrates quantum field theory and related AI technologies to design and develop intelligent global financial forecast and quantum trading systems. The book consists of two parts: Part I discusses the basic concepts and theories of quantum finance and related AI technologies, including quantum field theory, quantum price fields, quantum price level modelling and quantum entanglement to predict major financial events. Part II then examines the current, ongoing R&D projects on the application of quantum finance technologies in intelligent real-time financial prediction and quantum trading systems. This book is both
a textbook for undergraduate & masters level quantum finance, AI and fintech courses and a valuable resource for researchers and data scientists working in the field of quantum finance and intelligent financial systems. It is also of interest to professional traders/ quants & independent investors who would like to grasp the basic concepts and theory of quantum finance, and more importantly how to adopt this fascinating technology to implement intelligent financial forecast and quantum trading systems. For system implementation, the interactive quantum finance programming labs listed on the Quantum Finance Forecast Centre official site (QFFC.org) enable readers to learn how to use quantum finance technologies presented in the book.

Quantum Computing and Future Utpal Chakraborty, 2022-04-08 Be Prepared for a Revolutionary Transformation with Quantum Computing

KEY FEATURES
- Demystify concepts, working principles, and the process of Quantum Computing.
- Extensive coverage on various applications of Quantum Computing across industries and sectors.
- Learn how to harness the power of Quantum Computing and Artificial Intelligence in your business.

DESCRIPTION
The book ‘Quantum Computing and Future’ brings a holistic view of the potential of Quantum Computing across various industries and sectors. This book touches almost every area of application that can be benefitted from the capability of Quantum Computing, thus helping readers to understand how this innovative technology brings agility and transformation across enterprises. This book begins with concepts and principles of Quantum Computing followed by the process of quantum computing functions. It explains how Quantum Computing has led to transformation across sectors, including Healthcare, Banking, Finance, Genomics, Drug Discovery, Aviation, Tourism, Cryptocurrency, and Security. The book describes how an enterprise can leverage the tremendous capabilities of Quantum Computing and put its application in your business infrastructure for its optimal performance. You will see yourself most updated on the current progress of implementation of Quantum Computers and how their services can be available for enterprise use. By the end of the book, you will understand the enormous potential of Quantum Computing and how it is transforming businesses across different industries.

WHAT YOU WILL LEARN
- Explore Quantum concepts and principles such as Superposition, Entanglement, and Interference.
- Understand how Quantum Computing is revolutionizing the Healthcare and Medicine fields.
- Understand how Quantum Computing is transforming the Banking and Finance sectors.

WHO THIS BOOK IS FOR
This book is for IT and Non-IT professionals, developers, business analysts, business heads, CXOs, students, and researchers who are interested in Quantum Computing. Anyone who wants to know the latest trends and future of this cutting-edge technology will find this book helpful.

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7. Quantum Computing in Aviation, Travel, and Logistics
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9. Quantum Computing in Space Exploration, Astronomical, and

Quantum Computing Environments Sitharama S. Iyengar, Mario Mastriani, KJ Latesh Kumar, 2022-05-26 This book explains the evolution of techniques and strategies in quantum computing, discussing the digital transition towards the quantum computing application in various sectors. The book provides a comprehensive insight into the quantum mechanics and quantum computing techniques and tools and how they have evolved and the impacted in supporting and flourishing business during the quantum computing era. This book includes chapters that discuss the most primitive quantum schemes to the most recent use of Internet, finance and radar technology, thus leveraging greater use of new technologies like security and Internet and others. The content is relevant for an audience that is involved in the research and development of advanced quantum systems. It gives the industry, researchers, and students interested in learning the various quantum computing sectors with the necessary information and tools that can be used to research, design and develop advanced quantum computing systems and techniques.

Quantum Computing and Blockchain in Business Arunkumar Krishnakumar, 2020-03-31 Fintech veteran and venture capitalist, Arunkumar Krishnakumar, cuts through the hype to bring us a first-hand look into how quantum computing and Blockchain together could redefine industries and life as we know it. Key FeaturesTake a practical perspective on quantum computing and Blockchain technologies and their impacts on key industriesGain insights from experts who are applying quantum computing or Blockchain in their fieldsSee where quantum computing and Blockchain are heading, and where the two may intersect Book Description Are quantum computing and Blockchain on a collision course or will they be the most important trends of this decade to disrupt industries and life as we know it? Fintech veteran and venture capitalist Arunkumar Krishnakumar cuts through the hype to bring us a first-hand look into how quantum computing and Blockchain together are redefining industries, including fintech, healthcare, and research. Through a series of interviews with domain experts, he also explores these technologies’ potential to transform national and global governance and policies - from how elections are conducted and how smart cities can be designed and optimized for the environment, to what cyberwarfare
enabled by quantum cryptography might look like. In doing so, he also highlights challenges that these technologies have to overcome to go mainstream. Quantum Computing and Blockchain in Business explores the potential changes that quantum computing and Blockchain might bring about in the real world. After expanding on the key concepts and techniques, such as applied cryptography, qubits, and digital annealing, that underpin quantum computing and Blockchain, the book dives into how major industries will be impacted by these technologies. Lastly, we consider how the two technologies may come together in a complimentary way. What you will learn:

- Understand the fundamentals of quantum computing and Blockchain
- Gain insights from the experts who are using quantum computing and Blockchain
- Discover the implications of these technologies for governance and healthcare
- Learn how Blockchain and quantum computing may influence logistics and finance
- Understand how these technologies are impacting research in areas such as chemistry
- Find out how these technologies may help the environment and influence smart city development
- Understand the implications for cybersecurity as these technologies evolve

Who this book is for:
- This book is for tech enthusiasts – developers, architects, managers, consultants, and venture capitalists – working in or interested in the latest developments in quantum computing and blockchain.

Applications and Principles of Quantum Computing

Khang, Alex, 2024-01-31

In a world driven by technology and data, classical computing faces limitations in tackling complex challenges like climate modeling and financial risk assessment. These barriers impede our aspirations to revolutionize industries and solve intricate real-world problems. To bridge this gap, we must embrace quantum computing. Edited by Alex Khang PH, Principles and Applications of Quantum Computing is a transformative solution to this challenge. It delves into the interdisciplinary realms of computer science, physics, and mathematics, unveiling the incredible potential of quantum computing, which outperforms supercomputers by 158 million times. This technology, rooted in quantum mechanics, offers solutions to global problems and opens new frontiers in AI, cybersecurity, finance, drug development, and more. By engaging with this book, you become a pioneer in the quantum revolution, contributing to reshaping the limits of what’s achievable in our digital age.

Quantum Computing for the Quantum Curious

Ciáran Hughes, Joshua Isaacson, Anastasia Perry, Ranbel F. Sun, Jessica Turner, 2021-03-22

This open access book makes quantum computing more accessible than ever before. A fast-growing field at the intersection of physics and computer science, quantum computing promises to have revolutionary capabilities far surpassing “classical” computation. Getting a grip on the science behind the hype can be tough: at its heart lies quantum mechanics, whose enigmatic concepts can be imposing for the novice. This classroom-tested textbook uses simple language, minimal math, and plenty of examples to explain the three key principles behind quantum computers: superposition, quantum measurement, and entanglement. It then goes on to explain how this quantum world opens up a whole new paradigm of...
computing. The book bridges the gap between popular science articles and advanced textbooks by making key ideas accessible with just high school physics as a prerequisite. Each unit is broken down into sections labelled by difficulty level, allowing the course to be tailored to the student’s experience of math and abstract reasoning. Problem sets and simulation-based labs of various levels reinforce the concepts described in the text and give the reader hands-on experience running quantum programs. This book can thus be used at the high school level after the AP or IB exams, in an extracurricular club, or as an independent project resource to give students a taste of what quantum computing is really about. At the college level, it can be used as a supplementary text to enhance a variety of courses in science and computing, or as a self-study guide for students who want to get ahead. Additionally, readers in business, finance, or industry will find it a quick and useful primer on the science behind computing’s future.

Qiskit Pocket Guide James L. Weaver, Frank J. Harkins, 2022-06-14 The quantum computing market is predicted to grow by nearly $1.3 billion over the next five years. Why? Given their quantum mechanical nature, quantum computers are expected to solve difficult problems in chemistry, optimization, finance, and machine learning that classical computers find impossible to unravel. This pocket guide provides software developers with a quick reference to Qiskit, an open source SDK for working with quantum computers. Packed with helpful programming examples, tables, figures, and lists, this handy book helps you find the information you need to develop and debug quantum programs. Whether you’re focused on business, engineering, or scientific applications, you’ll learn how to choose and apply appropriate Qiskit classes, methods, and functions. Learn how to create quantum circuits, define quantum gates, and leverage the transpiler. Explore modules for implementing quantum information concepts and quantum algorithms. Survey features of Qiskit that abstract and facilitate working with various quantum computers and simulators. Learn how to use the latest version of the Open Quantum Assembly Language.

Quantum Technology for Economists Isaiah Hull,

Qiskit Pocket Guide James Weaver, Francis Harkins, 2022-11-30 Why is the quantum computing market expected to grow by nearly $1.3 billion over the next five years? Given their quantum mechanical nature, quantum computers can solve difficult problems in fields such as chemistry, optimization, finance, and machine learning that classical computers find impossible to unravel. This pocket guide provides software developers with a quick reference to Qiskit, an open source SDK for working with quantum computers. Packed with helpful programming examples, tables, figures, and lists, this handy book helps you find the information you need to develop and debug quantum programs. Whether you’re focused on business, engineering, or scientific applications, you’ll learn how to choose and apply the appropriate Qiskit classes, methods, and functions. You’ll also learn how to use the latest version of the Open Quantum Assembly Language, OpenQASM 3.0.

Evolution and Applications of Quantum Computing Sachi Nandan Mohanty, Rajanikanth Aluvalu, Sarita
The book is about the Quantum Model replacing traditional computing’s classical model and gives a state-of-the-art technical overview of the current efforts to develop quantum computing and applications for Industry 4.0. A holistic approach to the revolutionary world of quantum computing is presented in this book, which reveals valuable insights into this rapidly emerging technology. The book reflects the dependence of quantum computing on the physical phenomenon of superposition, entanglement, teleportation, and interference to simplify difficult mathematical problems which would have otherwise taken years to derive a definite solution for. An amalgamation of the information provided in the multiple chapters will elucidate the revolutionary and riveting research being carried out in the brand-new domain encompassing quantum computation, quantum information and quantum mechanics. Each chapter gives a concise introduction to the topic. The book comprises 18 chapters and describes the pioneering work on the interaction between artificial intelligence, machine learning, and quantum computing along with their applications and potential role in the world of big data. Subjects include: Combinational circuits called the quantum multiplexer with secured quantum gate (CSWAP); Detecting malicious emails and URLs by using quantum text mining algorithms to distinguish between phishing and benign sites; Quantum data traffic analysis for intrusion detection systems; Applications of quantum computation in banking, netnomy and vehicular ad-hoc networks, virtual reality in the education of autistic children, identifying bacterial diseases and accelerating drug discovery; The critical domain of traditional classical cryptography and quantum cryptography. Audience The book will be very useful for researchers in computer science, artificial intelligence and quantum physics as well as students who want to understand the history of quantum computing along with its applications and have a technical state-of-the-art overview.

Artificial Intelligence for Intelligent Systems

The aim of this book is to highlight the most promising lines of research, using new enabling technologies and methods based on AI/ML techniques to solve issues and challenges related to intelligent and computing systems. Intelligent computing easily collects data using smart technological applications like IoT-based wireless networks, digital healthcare, transportation, blockchain, 5.0 industry and deep learning for better decision making. AI enabled networks will be integrated in smart cities' concept for interconnectivity. Wireless networks will play an important role. The digital era of computational intelligence will change the dynamics and lifestyle of human beings. Future networks will be introduced with the help of AI technology to implement cognition in real-world applications. Cyber threats are dangerous to encode information from network. Therefore, AI-Intrusion detection systems need to be designed for identification of unwanted data traffic. This book: Provides a better understanding of artificial intelligence-based applications for future smart cities Presents a detailed understanding of artificial intelligence tools for intelligent technologies Showcases intelligent computing technologies in obtaining optimal solutions using artificial intelligence Discusses energy-efficient routing
protocols using artificial intelligence for Flying ad-hoc networks (FANETs) Covers machine learning-based Intrusion detection system (IDS) for smart grid It is primarily written for senior undergraduate, graduate students, and academic researchers in the fields of electrical engineering, electronics and communication engineering, and computer engineering.

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A Survey Of Quantum Computing For Finance

Introduction

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