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Post-Quantum Cryptography

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Proceedings, Part II

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Quantum Imaging Lecture Notes In Computer Science

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Quantum Imaging Lecture Notes In Computer Science:

Quantum Image Processing in Practice Artyom M. Grigoryan, Sos S. Agaian, 2025-04-01 Comprehensive resource addressing the need for a quantum image processing machine learning model that can outperform classical neural networks Quantum Image Processing in Practice explores the transformative potential of quantum color image processing across various domains including biomedicine entertainment economics and industry The rapid growth of image data especially in facial recognition and autonomous vehicles demands more efficient processing techniques Quantum computing promises to accelerate digital image processing DIP to meet this demand This book covers the role of quantum image processing QIP in quantum information processing including mathematical foundations quantum operations image processing using quantum filters quantum image representation and quantum neural networks It aims to inspire practical applications and foster innovation in this promising field Topics include Qubits and Quantum Logic Gates Introduces qubits the fundamental data unit in quantum computing and their manipulation using quantum logic gates like Pauli matrices rotations the CNOT gate and Hadamard matrices The concept of entanglement where qubits become interconnected is also explored highlighting its importance for applications like quantum teleportation and cryptography Two and Multiple Qubit Systems Demonstrates the importance of using two qubits to process color images enabling image enhancement noise reduction edge detection and feature extraction Covers the tensor product Kronecker sum SWAP gate and local and controlled gates Extends to multi qubit superpositions exploring local and control gates for three qubits such as the Toffoli and Fredkin gates and describes the measurement of superpositions using projection operators Transforms and Quantum Image Representations Covers the Hadamard Fourier and Heap transforms and their circuits in quantum computation highlighting their applications in signal and image processing Introduces the quantum signal induced heap transform for image enhancement classification compression and filtration Explores quantum representations and operations for images using the RGB XYZ CMY HSI and HSV color models providing numerous examples Fourier Transform Qubit Representation Introduces a new model of quantum image representation the Fourier transform qubit representation Describes the algorithm and circuit for calculating the 2 D quantum Fourier transform enabling advancements in quantum imaging techniques New Operations and Hypercomplex Algebra Presents new operations on qubits and quantum representations including multiplication division and inverse operations Explores hypercomplex algebra specifically quaternion algebra for its potential in color image processing Quantum Neural Networks QNNs Discusses QNNs and their circuit implementation as advancements in machine learning driven by quantum mechanics Summarizes various applications of QNNs and current trends and future developments in this rapidly evolving field The book also addresses challenges and opportunities in QIP research aiming to inspire practical applications and innovation It is a valuable resource for researchers students and professionals interested in the intersection of quantum computing and color image processing applications as well as those in visual communications multimedia

systems computer vision entertainment and biomedical applications

Synthetic Aperture Radar Image Processing

Algorithms for Nonlinear Oceanic Turbulence and Front Modeling Maged Marghany, 2024-07-09 Synthetic Aperture Radar Image Processing Algorithms for Nonlinear Oceanic Turbulence and Front Modelling is both a research and practice based reference that bridges the gap between the remote sensing field and the dynamic oceanography exploration field In this perspective the book explicates how to apply techniques in synthetic aperture radar and quantum interferometry synthetic aperture radar QInSAR for oceanic turbulence and front simulation and modelling The book includes detailed algorithms to enable readers to better understand and implement the practices covered in their own work and apply QInSAR to their own research This multidisciplinary reference is useful for researchers and academics in dynamic oceanography and modelling remote sensing and aquatic science as well as geographers geophysicists and environmental engineers Details the potential of synthetic aperture radar in imaging ocean surface dynamical features Includes detailed algorithms and methods allowing readers to develop their own computer algorithms Covers the latest applications of quantum image processing

Handbook of Research on Swarm Intelligence in Engineering Bhattacharyya, Siddhartha, Dutta,

Paramartha, 2015-04-30 Swarm Intelligence has recently emerged as a next generation methodology belonging to the class of evolutionary computing As a result scientists have been able to explain and understand real life processes and practices that previously remained unexplored The Handbook of Research on Swarm Intelligence in Engineering presents the latest research being conducted on diverse topics in intelligence technologies such as Swarm Intelligence Machine Intelligence Optical Engineering and Signal Processing with the goal of advancing knowledge and applications in this rapidly evolving field The enriched interdisciplinary contents of this book will be a subject of interest to the widest forum of faculties existing research communities and new research aspirants from a multitude of disciplines and trades

Digital and Image

Geometry Gilles Bertrand, Atsushi Imiya, Reinhard Klette, 2003-07-31 Images or discrete objects to be analyzed based on digital image data need to be represented analyzed transformed recovered etc These problems have stimulated many interesting developments in theoretical foundations of image processing This coherent anthology presents 27 state of the art surveys and research papers on digital image geometry and topology It is based on a winter school held at Dagstuhl Castle Germany in December 2000 and offers topical sections on topology representation geometry multigrid convergence and shape similarity and simplification

Handbook of Research on Computational Intelligence for Engineering, Science, and Business Bhattacharyya, Siddhartha, Dutta, Paramartha, 2012-11-30

Using the same strategy for the needs of image processing and pattern recognition scientists and researchers have turned to computational intelligence for better research throughputs and end results applied towards engineering science business and financial applications Handbook of Research on Computational Intelligence for Engineering Science and Business discusses the computation intelligence approaches initiatives and applications in the engineering science and business fields This reference aims to highlight

computational intelligence as no longer limited to computing related disciplines and can be applied to any effort which handles complex and meaningful information

Cryptanalysis-Driven Chaotic Image Encryption and Its Applications

Heping Wen,2022-12-27 Chaos cryptography is an inter discipline that combines chaotic theory and cryptography which includes chaotic secure communication system chaotic symmetric cipher chaotic public key cipher and chaotic hash function

1 In this academic monograph the main object of our discussion is symmetric chaotic cryptography The block diagram of symmetrical encryption and communication transmission is shown as Figure 1 2 The encryption process is EK CP in which P means plaintext while K means secret key and E represents encryption function Alice sends the ciphertext which has been encrypted to Bob the receiving end Bob makes use of the same secret key which is sent by a secure channel to decrypt and recover the original plaintext DK PC in which D is the decryption function For an attacker Oscar the ciphertext C is available but the secret key for the secure channel transmission is not known

Quantum Computing and Cryptography in Future Computers Sihare, Shyam R.,2024-07-26 In recent decades computing has undergone rapid evolutions and groundbreaking developments that affect almost every sector across the world The developments of quantum computing and quantum cryptography are similarly revolutionizing computing and security with lasting impacts and implications Quantum computing and quantum cryptography will pave the path for new opportunities for the future of computing Quantum Computing and Cryptography in Future Computers discusses quantum computing and quantum cryptography principles and their impact on future computers It includes coverage of the role of quantum computing to overcome the issues of current security methods It also discusses the application of quantum computing in various areas like security blockchain and more Covering topics such as attack detection machine learning and quantum key distribution this premier reference source is an ideal resource for developers engineers practitioners security experts students and educators of higher education librarians researchers and academicians

Nature-Inspired Computing: Concepts, Methodologies, Tools, and Applications

Management Association, Information Resources,2016-07-26 As technology continues to become more sophisticated mimicking natural processes and phenomena also becomes more of a reality Continued research in the field of natural computing enables an understanding of the world around us in addition to opportunities for man made computing to mirror the natural processes and systems that have existed for centuries Nature Inspired Computing Concepts Methodologies Tools and Applications takes an interdisciplinary approach to the topic of natural computing including emerging technologies being developed for the purpose of simulating natural phenomena applications across industries and the future outlook of biologically and nature inspired technologies Emphasizing critical research in a comprehensive multi volume set this publication is designed for use by IT professionals researchers and graduate students studying intelligent computing

Entropy in Image Analysis

Amelia Carolina Sparavigna,2019-06-24 Image analysis is a fundamental task for extracting information from images acquired across a range of different devices Since reliable quantitative results are requested image analysis requires highly

sophisticated numerical and analytical methods particularly for applications in medicine security and remote sensing where the results of the processing may consist of vitally important data The contributions to this book provide a good overview of the most important demands and solutions concerning this research area In particular the reader will find image analysis applied for feature extraction encryption and decryption of data color segmentation and in the support new technologies In all the contributions entropy plays a pivotal role

Optical and Digital Image Processing Gabriel Cristobal, Peter Schelkens, Hugo Thienpont, 2013-02-12 In recent years Moore's law has fostered the steady growth of the field of digital image processing though the computational complexity remains a problem for most of the digital image processing applications In parallel the research domain of optical image processing has matured potentially bypassing the problems digital approaches were suffering and bringing new applications The advancement of technology calls for applications and knowledge at the intersection of both areas but there is a clear knowledge gap between the digital signal processing and the optical processing communities This book covers the fundamental basis of the optical and image processing techniques by integrating contributions from both optical and digital research communities to solve current application bottlenecks and give rise to new applications and solutions Besides focusing on joint research it also aims at disseminating the knowledge existing in both domains Applications covered include image restoration medical imaging surveillance holography etc a very good book that deserves to be on the bookshelf of a serious student or scientist working in these areas Source Optics and Photonics News

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