Bouraoui Ouni

Optimization Algorithms For Reconfigurable FPGA Based Architectures

FPGA, design flow, reconfigurable architectures, System on Programmable chip

Ebook Fpga Imaging Reconfigurable Architectures Processing

Stamatis Vassiliadis,Dimitrios Soudris

Ebook Fpga Imaging Reconfigurable Architectures Processing:

   FPGA Imaging Marek Gorgón,2014-03-01 Anyone in need of new methods for implementing algorithms requiring large computing power for image processing transmission and analysis will find this book to be an invaluable reference Readers will learn that image processing algorithms can be implemented in parallel using reconfigurable FPGA based systems Ideas and design principles presented in this book can be applied using relatively inexpensive stand alone boards or cards connected to a PC for those building their own equipment and apparatus for imaging as well as those using much more expensive FPGA based blades working in a high performance computing environment   **Field-Programmable Custom Computing Technology: Architectures, Tools, and Applications** Jeffrey Arnold,Wayne Luk,Ken Pocek,2012-12-06 Field Programmable Custom Computing Technology Architectures Tools and Applications brings together in one place important contributions and up to date research results in this fast moving area In seven selected chapters the book describes the latest advances in architectures design methods and applications of field programmable devices for high performance reconfigurable systems The contributors to this work were selected from the leading researchers and practitioners in the field It will be valuable to anyone working or researching in the field of custom computing technology It serves as an excellent reference providing insight into some of the most challenging issues being examined today   **Advances in Signal Processing and Communication Engineering** Pradip Kumar Jain,Yatindra Nath Singh,Ravi Paul Gollapalli,S. P. Singh,2022-12-01 This book comprises select proceedings of the International Conference on Advances in Signal Processing and Communication Engineering ICASPACE 2021 The book covers several theoretical and mathematical approaches addressing day to day challenges in signal image and speech processing and advanced communication systems It primarily focuses on effective mathematical methods algorithms and models that enhance the performance of existing systems The topics covered in the book are advances in signal processing radar and biomedical image processing speech processing technical and environmental challenges in 5G technology and strategies for optimal utilization of resources to improve the efficacy of the communication systems in terms of bandwidth and radiating power etc The works published in the book will remarkably be helpful to prospective scholars academicians and students seeking knowledge in signal processing and communication engineering   **Design and Testing of Reversible Logic** Ashutosh Kumar Singh,Masahiro Fujita,Anand Mohan,2019-07-29 The book compiles efficient design and test methodologies for the implementation of reversible logic circuits The methodologies covered in the book are design approaches test approaches fault tolerance in reversible circuits and physical implementation techniques The book also covers the challenges and the reversible logic circuits to meet these challenges stimulated during each stage of work cycle The novel computing paradigms are being explored to serve as a basis for fast and low power computation   **Reconfigurable Computing** Maya B. Gokhale,Paul S. Graham,2006-07-04 A one of a kind survey of the field of Reconfigurable Computing Gives a comprehensive introduction to a discipline that offers a 10X

100X acceleration of algorithms over microprocessors Discusses the impact of reconfigurable hardware on a wide range of applications signal and image processing network security bioinformatics and supercomputing Includes the history of the field as well as recent advances Includes an extensive bibliography of primary sources **Architecture-Aware Optimization Strategies in Real-time Image Processing** Chao Li,Souleymane Balla-Arabe,Fan Yang,2017-10-30 In the field of image processing many applications require real time execution particularly those in the domains of medicine robotics and transmission to name but a few Recent technological developments have allowed for the integration of more complex algorithms with large data volume into embedded systems in turn producing a series of new sophisticated electronic architectures at affordable prices This book performs an in depth survey on this topic It is primarily written for those who are familiar with the basics of image processing and want to implement the target processing design using different electronic platforms for computing acceleration The authors present techniques and approaches step by step through illustrative examples This book is also suitable for electronics embedded systems engineers who want to consider image processing applications as sufficient imaging algorithm details are given to facilitate their understanding **Design for Embedded Image Processing on FPGAs** Donald G. Bailey,2023-08-08 Design for Embedded Image Processing on FPGAs Bridge the gap between software and hardware with this foundational design reference Field programmable gate arrays FPGAs are integrated circuits designed so that configuration can take place Circuits of this kind play an integral role in processing images with FPGAs increasingly embedded in digital cameras and other devices that produce visual data outputs for subsequent realization and compression These uses of FPGAs require specific design processes designed to mediate smoothly between hardware and processing algorithm Design for Embedded Image Processing on FPGAs provides a comprehensive overview of these processes and their applications in embedded image processing Beginning with an overview of image processing and its core principles this book discusses specific design and computation techniques with a smooth progression from the foundations of the field to its advanced principles Readers of the second edition of Design for Embedded Image Processing on FPGAs will also find Detailed discussion of image processing techniques including point operations histogram operations linear transformations and more New chapters covering Deep Learning algorithms and Image and Video Coding Example applications throughout to ground principles and demonstrate techniques Design for Embedded Image Processing on FPGAs is ideal for engineers and academics working in the field of Image Processing as well as graduate students studying Embedded Systems Engineering Image Processing Digital Design and related fields **Novel Reconfigurable Computing Architectures for Embedded High Performance Signal Processing and Numerical Applications** Fernando Enrique Ortiz Gual,2006 Field Programmable Gate Arrays FPGAs have a unique feature set that enables them to be adapted to virtually any computational problem Among their advantages are flexibility I O bandwidth and computational power Using this technology I have developed FPGA based architectures for a variety of computationally intensive problems

This research has enabled portable low power small form factor and high throughput coprocessors for a variety of computationally intense tasks Applications discussed include electromagnetic simulation synthetic aperture radar imaging and real time compensation for atmospheric effects in long range imaging Some of these applications were previously unfeasible in portable systems due to power and size constraints while others had software implementations too slow to be of practical use Combining reconfigurable technology and the techniques described in this document these problems can now be solved I begin with a description of the basic building blocks for these architectures including floating point arithmetic trigonometric and exponential units as well as memory and communication controllers Next each of the architectural designs is presented in detail including a discussion on the speedup associated with them Finally predictions will be given for how the field of reconfigurable computing will evolve in the coming years   Fine- and Coarse-Grain Reconfigurable Computing Stamatis Vassiliadis,Dimitrios Soudris,2007-09-24 Fine and Coarse Grain Reconfigurable Computing gives the basic concepts and building blocks for the design of Fine or FPGA and Coarse Grain Reconfigurable Architectures Recently developed integrated architecture design and software supported design flow of FPGA and coarse grain reconfigurable architecture are also described Part I consists of two extensive surveys of FPGA and Coarse Grain Reconfigurable Architectures In Part II case studies innovative research results about reconfigurable architectures and design frameworks from three projects AMDREL MOLEN and ADRES and DRESC and a new classification according to microcoded architectural criteria are described Fine and Coarse Grain Reconfigurable Computing is an essential reference for researchers and professionals and can be used as a textbook by undergraduate graduate students and professors   **FPGA Implementation a Reconfigurable Address Generation Unit for Image Processing Applications** Kok Horng Kam,2013   **Towards Ubiquitous Low-power Image Processing Platforms** Magnus Jahre,Diana Göhringer,Philippe Millet,2020-12-15 This book summarizes the key scientific outcomes of the Horizon 2020 research project TULIPP Towards Ubiquitous Low power Image Processing Platforms The main focus lies on the development of high performance energy efficient embedded systems for the growing range of increasingly complex image processing applications The holistic TULIPP approach is described in the book which addresses hardware platforms programming tools and embedded operating systems Several of the results are available as open source hardware software for the community The results are evaluated with several use cases taken from real world applications in key domains such as Unmanned Aerial Vehicles UAVs robotics space and medicine Discusses the development of high performance energy efficient embedded systems for the growing range of increasingly complex image processing applications Covers the hardware architecture of embedded image processing systems novel methods tools and libraries for programming those systems as well as embedded operating systems to manage those systems Demonstrates results with several challenging applications such as medical systems robotics drones and automotive   **Fpga Architectures for Logarithmic Colour Image Processing** Uche Nnolim,2009   **Reconfigurable Computing** Scott Hauck,André

DeHon,2010-07-26 Reconfigurable Computing marks a revolutionary and hot topic that bridges the gap between the separate worlds of hardware and software design the key feature of reconfigurable computing is its groundbreaking ability to perform computations in hardware to increase performance while retaining the flexibility of a software solution Reconfigurable computers serve as affordable fast and accurate tools for developing designs ranging from single chip architectures to multi chip and embedded systems Scott Hauck and Andre DeHon have assembled a group of the key experts in the fields of both hardware and software computing to provide an introduction to the entire range of issues relating to reconfigurable computing FPGAs field programmable gate arrays act as the computing vehicles to implement this powerful technology Readers will be guided into adopting a completely new way of handling existing design concerns and be able to make use of the vast opportunities possible with reconfigurable logic in this rapidly evolving field Designed for both hardware and software programmers Views of reconfigurable programming beyond standard programming languages Broad set of case studies demonstrating how to use FPGAs in novel and efficient ways **Domain-specific Reconfigurable Architectures for Image and Video Processing Applications** Arjun Kasturi Pai,2008 **FlexWAFE** ,2012 **Reconfigurable Computing** Joao Cardoso,Michael Hübner,2011-08-17 As the complexity of modern embedded systems increases it becomes less practical to design monolithic processing platforms As a result reconfigurable computing is being adopted widely for more flexible design Reconfigurable Computers offer the spatial parallelism and fine grained customizability of application specific circuits with the postfabrication programmability of software To make the most of this unique combination of performance and flexibility designers need to be aware of both hardware and software issues FPGA users must think not only about the gates needed to perform a computation but also about the software flow that supports the design process The goal of this book is to help designers become comfortable with these issues and thus be able to exploit the vast opportunities possible with reconfigurable logic **Reconfigurable Logic** Pierre-Emmanuel Gaillardon,2018-09-03 During the last three decades reconfigurable logic has been growing steadily and can now be found in many different fields Field programmable gate arrays FPGAs are one of the most famous architecture families of reconfigurable devices FPGAs can be seen as arrays of logic units that can be reconfigured to realize any digital systems Their high versatility has enabled designers to drastically reduce time to market and made FPGAs suitable for prototyping or small production series in many branches of industrial products In addition and thanks to innovations at the architecture level FPGAs are now conquering segments of mass markets such as mobile communications Reconfigurable Logic Architecture Tools and Applications offers a snapshot of the state of the art of reconfigurable logic systems Covering a broad range of architectures tools and applications this book Explores classical FPGA architectures and their supporting tools Evaluates recent proposals related to FPGA architectures including the use of network on chips NoCs Examines reconfigurable processors that merge concepts borrowed from the reconfigurable domain into processor design Exploits FPGAs for high performance systems efficient error correction codes

and high bandwidth network routers with built in security Expounds on emerging technologies to enhance FPGA architectures improve routing structures and create non volatile configuration flip flops Reconfigurable Logic Architecture Tools and Applications reviews current trends in reconfigurable platforms providing valuable insight into the future potential of reconfigurable systems **Real Time Hyperspectral Image Processing** Chein-I Chang,2016-01-06 This book focuses on architecture and implementation of algorithms specifically on their real time and causal processing implementation architectures of FPGA design and parallel processing It concludes with applications to multispectral imaging and medical imaging All these topics have great potential in and impact on hyperspectral data communications and hardware implementation Reconfigurable platform-based design in FPGAs for video image processing Nicholas Peter Sedcole,2006

Principles and Structures of FPGAs Hideharu Amano,2018-09-13 This comprehensive textbook on the field programmable gate array FPGA covers its history fundamental knowledge architectures device technologies computer aided design technologies design tools examples of application and future trends Programmable logic devices represented by FPGAs have been rapidly developed in recent years and have become key electronic devices used in most IT products This book provides both complete introductions suitable for students and beginners and high level techniques useful for engineers and researchers in this field Differently developed from usual integrated circuits the FPGA has unique structures design methodologies and application techniques Allowing programming by users the device can dramatically reduce the rising cost of development in advanced semiconductor chips The FPGA is now driving the most advanced semiconductor processes and is an all in one platform combining memory CPUs and various peripheral interfaces This book introduces the FPGA from various aspects for readers of different levels Novice learners can acquire a fundamental knowledge of the FPGA including its history from Chapter 1 the first half of Chapter 2 and Chapter 4 Professionals who are already familiar with the device will gain a deeper understanding of the structures and design methodologies from Chapters 3 and 5 Chapters 6 8 also provide advanced techniques and cutting edge applications and trends useful for professionals Although the first parts are mainly suitable for students the advanced sections of the book will be valuable for professionals in acquiring an in depth understanding of the FPGA to maximize the performance of the device

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