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OpenCL In Action: How To Accelerate Graphics And Computations



Synopsis

Summary OpenCL in Action is a thorough, hands-on presentation of OpenCL, with an eye toward showing developers how to build high-performance applications of their own. It begins by presenting the core concepts behind OpenCL, including vector computing, parallel programming, and multi-threaded operations, and then guides you step-by-step from simple data structures to complex functions. About the Technology Whatever system you have, it probably has more raw processing power than you're using. OpenCL is a high-performance programming language that maximizes computational power by executing on CPUs, graphics processors, and other number-crunching devices. It's perfect for speed-sensitive tasks like vector computing, matrix operations, and graphics acceleration. About this Book OpenCL in Action blends the theory of parallel computing with the practical reality of building high-performance applications using OpenCL. It first guides you through the fundamental data structures in an intuitive manner. Then, it explains techniques for high-speed sorting, image processing, matrix operations, and fast Fourier transform. The book concludes with a deep look at the all-important subject of graphics acceleration. Numerous challenging examples give you different ways to experiment with working code. A background in C or C++ is helpful, but no prior exposure to OpenCL is needed. Purchase of the print book comes with an offer of a free PDF, ePub, and Kindle eBook from Manning. Also available is all code from the book. What's InsideLearn OpenCL step by step Tons of annotated code Tested algorithms for maximum performance***** Table of ContentsPART 1 FOUNDATIONS OF OPENCL PROGRAMMING Introducing OpenCL Host programming: fundamental data structures Host programming: data transfer and partitioning Kernel programming: data types and device memory Kernel programming: operators and functions Image processing Events, profiling, and synchronization Development with C++ Development with Java and Python General coding principles PART 2 CODING PRACTICAL ALGORITHMS IN OPENCL Reduction and sorting Matrices and QR decomposition Sparse matrices Signal processing and the fast Fourier transform PART 3 ACCELERATING OPENGL WITH OPENCL Combining OpenCL and OpenGL Textures and renderbuffers

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Customer Reviews

Having searched long and hard for guide to OpenCL that is more than the standard collection of stapled-together vendor whitepapers or a page-by-page rehashing of the spec, I was thrilled to come across OpenCL in Action. This book clearly illustrates all the important aspects of OpenCL, from high-level introduction to low-level details. In my opinion, one of the most important selling points of this book is its readability. Clearly the author is a gifted technical writer, as he is able to explain the nuances of complicated topics such as data partitioning and synchronization in a manner that clarifies the motivating problems and potential approaches without making you want to tear your eyeballs out with boredom. Part of this is his straightforward and enjoyable writing style; he avoids unnecessary filler content and does not rush straight into technical details without first grounding the reader. The other part is his choice of examples -- unlike most other books on the topic, the problems he uses to illustrate the topics are neither uselessly mundane nor bewildering in their domain-specific complexity. This has become my go-to guide when I want a refresher course on a specific OpenCL topic, or need guidance understanding the OpenCL spec. If you don't believe me, go to the publisher's web site where several sample chapters are available online. Or save yourself some time and just purchase this book. I guarantee you will be getting your money's worth.

Really found this book indispensable. OpenCL is a pretty advanced topic, and takes diligence and patience to learn. But "OpenCL in Action" has been a terrific guide. The book was so thorough, it even covered a number of related algorithms such as sparse matrices - interesting reading and examples. The only issues are that the OpenCL spec is still being modified, so keep OpenCL specs 1.1 and 2.0 handy (in high tech, we are all used to this), and a few of the book's demo's needs additional downloads to run, but most ran right away. Overall, the book is well-written, at a nice pace, interesting, and quite beneficial.

(I did not buy the book, I'm reading it via SafariBooks.)I've started reading several OpenCL books, but this is the only one that I intend to finish. The book is written well, the writing is lucid, and English is good, so it's a pleasure to read. All the concepts are explained with nice analogues to concepts from non-programming contexts so they are easy to understand. For each programming concept there is a matching, well-documented source example that is easy to study and modify and experiment. I think even if your goal is to go straight to 2.0 (this book is about 1.x), you're better off with getting the basics straight from this book, and then continuing to another book that covers OpenCL 2.0.Highly recommended.

If you are a newbie in OpenCL and want to explore this wonderful parallel world, this is the way!C programming knowledge and this book is all you need.There is no other book better explained out there. This book will bring you all the basics, and after this you can continue with more advanced books.

Manning's "OpenCL in Action" is just what the doctor ordered, if he is a doctor of Astrophysics, Mathematics or a graphics computing specialist, possibly even you. Do you harbor the desire to acquire StarTrek's ship computer for your personal use? Perhaps you could be delighted to discover that your GPU card has a secret identity as a supercomputer? If so, this book will open up the world of graphics super computing (GPGPU) to you for only a small fee and a few dozen hours of study. Be forewarned though, this is not a journey for the timid or the unprepared. Matthew Scarpino delves into a comprehensive introduction to the world of OpenCL computing that will challenge your comprehension and energy to gain a wide understanding of how to couple various standard computing languages and commercial computing platforms into opening up the mysterious ability hidden your computer's GPU that can amplify the power of your computer over 100 to 1.It is rare that a revolution in any field will happen in most people's career. Most developments are incremental and well understood before they are widely accepted. I have watched the field of personal computing evolve for thirty years in a slow and methodical way. Computing advances have followed More's law of increasing complexity in the number of transistors on a die for just as long. Computing speed has been tied directly to this, until now. But with the ability to run parallel computing on a GPU using hundreds of processors, the ability to achieve an astounding leap for personal computers has arrived overnight.This book is one of the first to explore this fascinating and rapidly expanding area of programming. The author gives a comprehensive introduction to OpenCL and source code is available for download from his site([...]) or from Manning's site. C++, Python,

and Java language approaches are all covered. The book is an introduction though, there is far too much material to cover to hold the reader's hand for every step. You will have to try things out and experiment with your own programs to master this programming area. The book will get you close enough for your imagination to complete the journey. There are three parts to the book. Part one is the largest having ten chapters. It introduces OpenCL's fundamental data types and structures. Then it introduces kernel operations and image processing. I advise you to think of these features abstractly to derive the most from the text. Diagrams and code snippets abound in order to make the training more digestible. Each chapter follows the well known teaching process of: Tell them what you're going to teach them; Then teach them; then summarize what you just taught them. This part ends with superficial training in three different computer languages. Part two delves deeper into the use of matrices and sorting which are the power centers of parallel computing. Here is some of the best advice the book has to give on how to get the GPU to perform well for you. Finally, the use of the Fast Fourier Transform is introduced as a tool that can be used to identify patterns of energy in a matrix or find hidden signals in a message. Engineers will be especially interested in this chapter. Part three is a short one chapter section detailing how to use OpenCL with OpenGL. This section focuses on the primary use of the GPU which is to apply this long introduction to GPGPU computing to delivering processed images to the video monitor. I know that Linux programmers have been wishing for something like this in Linux programming books for a decade. Your ship has finally come in. A block of appendices ends the book with a number of topics mostly surrounding the use of OpenGL and GLUT. This may not be the happiest place for Windows programmers, but since Microsoft is moving Windows into the mobile computing world at a fast pace, this information may be of surprisingly good value for phone and tablet users. I found a lot to think about reading this book. It opened up areas that I didn't even know were associated with my computing needs and I'm now shopping for GPUs with a much greater computing power than I have in the past. I want to use this new ability of my desktop to try out computing goals that I could only dream about before. And I want to design a program to do field testing of automobiles on a tablet. One last word of warning, looking through the specs of these high performance computing cards shows that each one can draw from 200 W on idle to almost 600 W when fully operating. There are motherboards that have three or four PCIe slots for GPUs. This is why a motherboard with a fast CPU and 12GB of memory can reliably run off a 250 W power supply. Plug in two GPUs and you won't get a game to finish unless that power supply can source over 1200 W!! To quote one move "I think I need a bigger box".

This is an excellent beginning overview of opencl. Perfect combination of explanation, code samples, and math!

Looks like it will be useful once I get started with a compatible C++ compiler.

It summarizes in a very clear way the fundamentals and more advanced topics of OpenCL. The example codes are in general very clear and easy to compile and execute under Visual Studio 2010, but some codes need corrections in order to be able to use them. It is a must if one wants to start learning OpenCL.

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