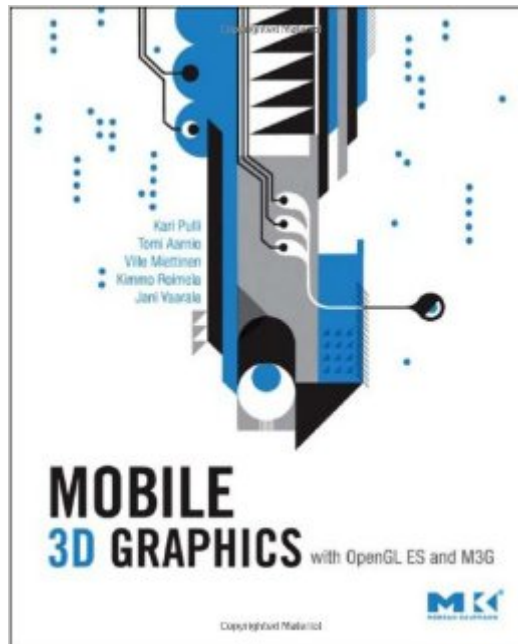


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# Mobile 3D Graphics: With OpenGL ES And M3G (The Morgan Kaufmann Series In Computer Graphics)



## Synopsis

Graphics and game developers must learn to program for mobility. This book will teach you how.

"This book - written by some of the key technical experts...provides a comprehensive but practical and easily understood introduction for any software engineer seeking to delight the consumer with rich 3D interactive experiences on their phone. Like the OpenGL ES and M3G standards it covers, this book is destined to become an enduring standard for many years to come." - Lincoln Wallen, CTO, Electronic Arts, Mobile

"This book is an escalator, which takes the field to new levels. This is especially true because the text ensures that the topic is easily accessible to everyone with some background in computer science...The foundations of this book are clear, and the authors are extremely knowledgeable about the subject." - Tomas Akenine-Möller, bestselling author and Professor of Computer Science at Lund University

"This book is an excellent introduction to M3G. The authors are all experienced M3G users and developers, and they do a great job of conveying that experience, as well as plenty of practical advice that has been proven in the field." - Sean Ellis, Consultant Graphics Engineer, ARM Ltd

The exploding popularity of mobile computing is undeniable. From cell phones to portable gaming systems, the global demand for multifunctional mobile devices is driving amazing hardware and software developments. 3D graphics are becoming an integral part of these ubiquitous devices, and as a result, Mobile 3D Graphics is arguably the most rapidly advancing area of the computer graphics discipline. Mobile 3D Graphics is about writing real-time 3D graphics applications for mobile devices. The programming interfaces explained and demonstrated in this must-have reference enable dynamic 3D media on cell phones, GPS systems, portable gaming consoles and media players. The text begins by providing thorough coverage of background essentials, then presents detailed hands-on examples, including extensive working code in both of the dominant mobile APIs, OpenGL ES and M3G. C/C++ and Java Developers, graphic artists, students, and enthusiasts would do well to have a programmable mobile phone on hand to try out the techniques described in this book. The authors, industry experts who helped to develop the OpenGL ES and M3G standards, distill their years of accumulated knowledge within these pages, offering their insights into everything from sound mobile design principles and constraints, to efficient rendering, mixing 2D and 3D, lighting, texture mapping, skinning and morphing. Along the way, readers will benefit from the hundreds of included tips, tricks and caveats. \*Written by experts at Nokia whose workshops at industry conferences are blockbusters\*The programs used in the examples are featured in thousands of professional courses each year\*Extensive working sample code is presented throughout the book and on the companion website

## Book Information

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## Customer Reviews

The Mobile 3D Graphics book is a tutorial-type book that helps to understand Mobile 3D APIs, OpenGL ES and M3G. The book was written for graphics application developers, game developers, Java developers, and students. The book consists of three parts: anatomy of a graphics engine, OpenGL ES, and M3G, each divided into chapters. In each chapter, one aspect of the mobile 3D graphics is discussed (e.g. in the first part of the book, chapters include: low-level rendering, animation, scene management, and performance/scalability). Each chapter discusses the important issues, and sample code segments are provided. The best features of the book include: its in-depth coverage of the mobile graphics techniques; how to start developing OpenGL ES and M3G application; performance tips and pitfalls; and how to accelerate your code using fixed-point arithmetic; and how to increase performance of Java code. The Web site that complements the book([...]) contains code samples and demos. I found the book to be a good introduction to mobile graphics programming, perhaps the best among mobile 3D graphics programming books. The authors are also among the experts of 3D mobile graphics: they helped to start the OpenGL ES and M3G standardization groups, and actively contributed to development of these standards. On the flip side, as the other reviewers have said, OpenGL ES 2.0 is not included in this book. But, it will be some time until we will see widespread use of OpenGL ES 2.0 enabled mobile devices. Even then, developers will still be able to use OpenGL 1.x on 2.0 hardware, with appropriate 1.x drivers). So, as of this writing, this is not an outdated book! Also, a complete case study (e.g. a small OpenGL ES or

M3G game, complete with user input, rendering optimization, etc.) would be a very useful addition to the book.

This book is a must-have for anyone planning to develop interactive 3D graphics applications on mobile devices. The authors are known experts in the field and greatly contributed to the OpenGL ES and M3G standards. Overall, I think the book is a very valuable reference for 3D graphics practitioners who want to get a start on implementing applications for mobile devices. At the same time the book is also well-suited as a text-book accompanying a course on mobile graphics. The book comprises of three parts. Part I explains general 3D graphics concepts with attention to the specifics of mobile devices. It begins with a general introduction to mobile device technology. After a chapter on important mathematical concepts for 3D graphics, the low-level concepts of a 3D graphics engine like OpenGL ES are explained (what are fragment and vertex operations, how does lighting work, what is texturing etc.). The two subsequent chapters explain high-level concepts for animation (e.g key-frame interpolation, skinning) as well as scene management (e.g. scene graphs). Here the focus lies on concepts supported by M3G. The last chapter in part I is an excellent intro to performance and scalability issues on mobile devices. It gives practical hints on how to identify performance bottlenecks, how to write compact code, and how to make your application scale to a range of devices. Part II of the book addresses the low-level mobile 3D graphics API OpenGL ES. It is not a tutorial-like intro to OpenGL ES which would augment a program step-by-step with new features and talk the reader through it. It is rather an excellent reference which explains how all raster-engine concepts introduced in part I can be practically interfaced (OpenGL ES function names and choice of parameters etc.). Also, the authors explain in detail what the differences to OpenGL are and why these differences exist. Again, it comes in very handy that the authors point out potential performance and memory issues and give hints on how to handle them. Part III of the book focuses on M3G. After a general explanation of M3G features, as well as specifics due to limitations of Java on mobile devices, the book first explains the basic class structure. Thereafter, it illustrates how to interface OpenGL ES concepts with M3G. Subsequently, a detailed explanation of the M3Gscene graph is given (what types of nodes exist, how to do picking etc.). Finally, one chapter is dedicated to the support of basic animation concepts (key-framing, deforming meshes, skinned characters). Overall, part III contains more practical code examples - which makes a lot of sense, since in practice the majority of developers may want to use M3G as it tremendously simplifies cross-platform development. In general, I think the book is an excellent introduction to mobile 3D graphics that has a decent mix between explanation of general concepts and actual

APIs. What I particularly like is the frequent pointing out of performance issues that developers must be aware of when working on mobile devices. When developing in this domain, one definitely needs to know about limitations imposed by the restricted computational and memory resources. Also one needs to know how the implementation may even influence power consumption. All of this is treated in great detail. The only minor downside is that the book does not cover OpenGL ES 2.0 and any fragment or vertex shader programming. There are, however, other books which focus solely on shader development. To summarize, this book is an excellent introduction and reference to mobile 3D graphics that everyone working in the field should own.

I purchased this book primarily for OpenGL on mobile devices. I needed something more specific to Apple's iPhone SDK, however I am glad I went with this more generic book instead. OpenGL is a complex standard and has a long history. After reading this book I understand better what are the various forces at play in the evolution of the standard, the various layers of the system and how they play between themselves. A big relief is that you do not have to understand all of the standard and certainly not use it all. The down side is that you need lots of information to be able to zoom into the specific APIs that make sense for your application. So while this book is not a theoretical book expect to have to invest some days in it before you start to get some value. This is a reflection of the complexity of the subject treated. I recommend this book if you are interested by OpenGL (or the java equivalent) in the mobile space.

The book is well written and is quite informative. It has an obligation to be because the authors pretty much created OpenGL ES or helped shape the specs. Everything you would expect from this book is there... from the basic math to the implementation details, and tips on how to design a game/graphics engine. It is a valuable, digestible book on Mobile 3D. However it does have a negative point, that is: very little coverage of shaders and OpenGL ES 2.0. By 2010 I doubt there will be a fixed function engine being developed, so I am hopeful for a 2nd edition that updates the API to 2.0. If ES 2.0 is what you are looking for, there is an OpenGL ES 2.0 book coming out in August 08, so learn this book and then move on to that book. Though the problem with shader based engines is that they are destructive (as in break backwards compatibility with fixed function APIs like ES 1.\*) Bottom line: If you are into mobile 3D graphics this is a must have book. Be you a C++ or a Java programmer.

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