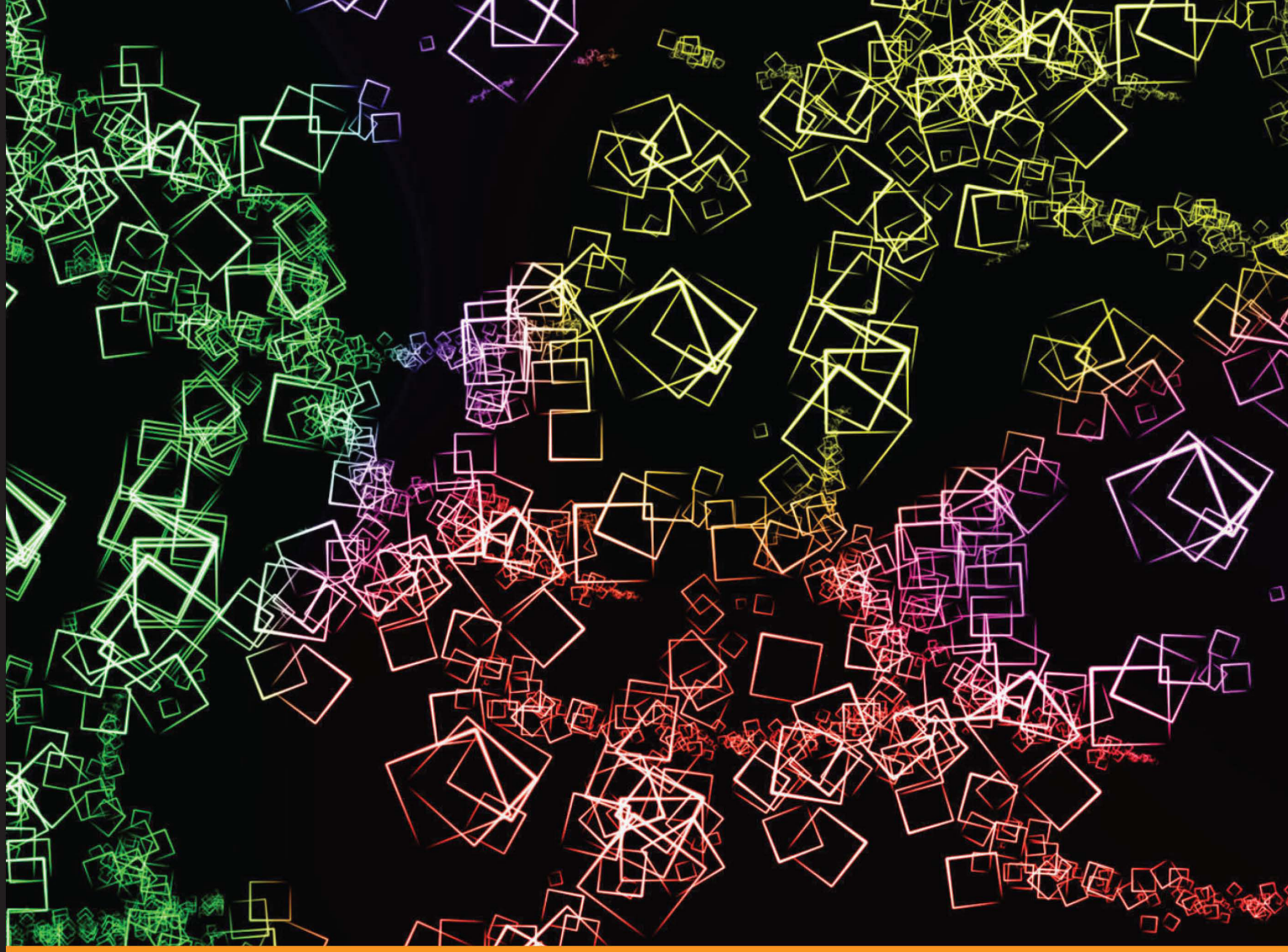

Community Experience Distilled

Augmented Reality with Kinect

Develop your own handsfree and attractive augmented reality applications with Microsoft Kinect

Rui Wang

[PACKT] PUBLISHING

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About the Author

Rui Wang is a Software Engineer at Beijing Crystal Digital Technology Co., Ltd. (Crystal CG), in charge of the new media interactive application design and development. He wrote a Chinese book called *OpenSceneGraph Design and Implementation* in 2009. He also wrote the book *OpenSceneGraph 3.0 Beginner's Guide* in 2010 and *OpenSceneGraph 3.0 Cookbook* in 2012, both of which are published by Packt Publishing and co-authored by Xuelei Qian. In his spare time he also writes novels and is a guitar lover.

I must express my deep gratitude to the entire Packt Publishing team for their great work in producing a series of high-quality Mini books, including this one, which introduces the cutting-edge Kinect-based development. Many thanks to Zhao Yang and my other colleagues at Crystal CG, for their talented ideas on some of the recipes in this book. And last but not the least, I'll extend my heartfelt gratitude to my family for their love and support.

About the Reviewers

Ricard Borràs Navarra has always been working around computer vision and machine learning. He started creating machines that apply pattern recognition to quality assortment in the cork production industry. Later, he applied these techniques for human tracking in complex scenarios, creating audience measurement, and people-counter solutions for retail stores.

With the eruption of Kinect, he started working on and deploying augmented reality interactive applications based on this great device. These applications were targeted at the marketing and retail sectors.

All these projects were developed by him as an Inspecta (`www.inspecta.es`) employee. Also, Ricard has developed several freelance projects based on augmented reality.

Vangos Pterneas is a professional Software Engineer, passionate about natural user interfaces. He has been a Kinect enthusiast ever since the release of the very first unofficial SDKs and has already published a couple of commercial Kinect applications.

He has worked for Microsoft Innovation Center as a .NET developer and consultant and he's now running his own company named LightBuzz. LightBuzz has been awarded the first place in Microsoft's worldwide innovation competition, held in New York.

When he is not coding, he loves blogging about technical stuff and providing the community with open source utilities.

Table of Contents

Preface

Microsoft Kinect was released in the winter of 2010. As one of the first civil handsfree motion input devices, it brings a lot of fun to end users of Xbox 360 and Windows PCs. And because Kinect is very useful for designing interactive methods in user applications, new media artists and VJs (video jockeys) are also interested in this new technology as it makes their performances more dramatic and mystical.

In this book, we will focus on introducing how to develop C/C++ applications with the Microsoft Kinect SDK, as well as the FreeGLUT library for OpenGL support, and the FreeImage library for image loading. We will cover the topics of Kinect initialization, color and depth image streaming, and skeleton motion and face tracking, and discuss how to implement common gestures with Kinect inputs. A simple but interesting Fruit Ninja-like game will be implemented in the last chapter of this book. Some alternative middlewares and resources will be introduced in the *Appendix*, *Where to Go from Here*, for your reference.

What this book covers

Chapter 1, *Getting Started with Kinect,* shows you how to install Kinect hardware and software on your Windows PC and check if Kinect will start.

Chapter 2, *Creating Your First Program,* demonstrates how to create an OpenGL-based framework first and then initialize the Kinect device in user applications.

Chapter 3, *Rendering the Player,* shows you how to read color and depth images from the Kinect built-in cameras and display them in the OpenGL-based framework. A common way to implement the green screen effect is also discussed.

Chapter 4, *Skeletal Motion and Face Tracking,* demonstrates how to obtain and render the skeleton data calculated by the Kinect sensor. It also introduces the face detection and facial mesh generation APIs with examples.

Chapter 5, *Designing a Touchable User Interface,* shows you how to use Kinect APIs to simulate multi-touch inputs, which are very common in modern interactive applications and GUI developments.

Chapter 6, *Implementing the Scene and Game Play,* demonstrates how to make use of all prior knowledge we have gained to make a Fruit Ninja-like game, which uses Kinect as the input device.

Appendix, *Where to Go from Here,* introduces more alternative middleware and many resource websites for learning and developing Kinect.

What you need for this book

To use this book, you will need a graphics card with robust OpenGL support. It would be better if it is with the latest OpenGL device driver installed from your graphics hardware vendor.

You will also need a working Visual Studio compiler so as to convert C++ source code into executable files. A working Kinect hardware, Microsoft Kinect SDK, and Developer Kit are also required.

Who this book is for

This book is intended for software developers, researchers, and students who are interested in developing Microsoft Kinect-based applications. You should also have basic knowledge of C++ programming before reading this book. Some experience of programming real-time graphics APIs (for example, OpenGL) may be useful, but is not required.

Conventions

In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.

Code words in text are shown as follows: "The updating of Kinect and user data will be done in the `update()` method."