

Intelligent Systems, Control and Automation: Science and Engineering

Volume 68

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Virtual Reality Technology and Applications

 Springer

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ISSN 2213-8986 ISSN 2213-8994 (electronic)
ISBN 978-94-007-6909-0 ISBN 978-94-007-6910-6 (eBook)
DOI 10.1007/978-94-007-6910-6
Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2013943952

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Printed on acid-free paper

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Preface

We began working on virtual reality in the first years of the twenty-first century, but that was not our first glimpse of it. As we grew up, we watched virtual reality through the eyes of laymen as it stepped out of science fiction and into everyday life. It has become a fascinating field that brings together engineers, programmers, designers, artists, psychologists, and others. These people collaborate to create something more than the sum of their parts, a virtual world made of zeros and ones that nonetheless feels real.

The magic of virtual worlds captivated us all, but what we desired most was to peer underneath the hood and see just how things worked. We thus became involved in the scientific and technical aspects of virtual reality: haptic interfaces, graphics design, psychological aspects, and others. We created this book for those who are also fascinated by the inner workings of this intriguing technology.

The book covers the individual elements of virtual reality, delving into their theory and implementation. It also describes how the elements are put together to create the virtual worlds we experience. Most of the knowledge contained within comes from our own experience in human–robot interaction, where virtual environments are used to entertain, motivate, and teach. Distilling the knowledge into text form has been an arduous process, and we leave it to readers to decide whether we were successful.

The text was originally aimed at engineers, researchers and graduate students with a solid foundation in mathematics. Our main motivation for writing it was that many existing virtual reality books do not have a sufficient focus on the technical, mathematical aspects that would be of interest to engineers. Nonetheless, the actual amount of mathematical content varies greatly from chapter to chapter. Readers with backgrounds other than engineering should be able to read and understand most chapters, though they may miss out on some of the mathematical details. Due to its origins, however, the book is focused less on psychological aspects and more on technical aspects—the hardware and software that makes virtual reality work.

Many people contributed either directly or indirectly to the creation of this book. Though they are too many to list, we would like to thank colleagues at the

University of Ljubljana and ETH Zurich, who travelled the path of research with us and helped us to discover virtual reality. We would also like to thank the diligent men and women at Springer who turned the book into reality. Cynthia Feenstra deserves special thanks for being in touch with us throughout the preparation process and putting up with occasionally missed deadlines. And as always, we would like to thank our families for supporting us day after day. Whoever you are, we hope you will enjoy reading this book.

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