
Preface

Recent changes in patient awareness and acceptance of adverse effects in medicine and an increasing focus on patient safety have put traditional educational paradigms in the medical area to the test. Related to this, the great potential of training approaches using virtual reality (VR) techniques in surgical education has been recognized for a long time.

A key element of effective VR-based training is the ability to generate variable scenarios. Due to this, the adaptation of a trainee to a specific scene can be avoided and natural variation, which is encountered in most real life situations, can be included. Model generation in VR-based applications is in general a difficult task. The increase of computational power has enabled the display of larger and more detailed virtual environments, thus reinforcing the need for improved methods for model acquisition, enhancement, optimization, and adaptation.

In the context of surgical scene generation for training in medicine, this book examines the main components needed to define such a scenario. Three steps in the process are analyzed – the generation of the scene geometry, the modelling of organ appearance, and the definition of biomechanical parameters. This book provides an extensive overview of related work in these three different directions and introduces specific solutions in detail. Examples show the outcome and performance of the presented methods. The work represents an excellent resource for anybody involved in generating training scenarios in medical education, as well as in VR-based training in general.

This book is based on my *Habilitationsschrift* at ETH Zurich, Switzerland in 2007, and covers activities which have been carried out in the Virtual Reality in Medicine group during the development of various surgical simulator systems over a period of about eight years.

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This list is certainly incomplete, and I apologize to anyone omitted.

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