Preface

This textbook on *Photogrammetric Computer Vision – Statistics, Geometry, Orientation and Reconstruction* provides a statistical treatment of the geometry of multiple view analysis useful for camera calibration, orientation, and geometric scene reconstruction.

The book is the first to offer a joint view of photogrammetry and computer vision, two fields that have converged in recent decades. It is motivated by the need for a conceptually consistent theory aiming at generic solutions for orientation and reconstruction problems.

Large parts of the book result from teaching bachelor's and master's courses for students of geodesy within their education in photogrammetry. Most of these courses were simultaneously offered as subjects in the computer science faculty.

The book provides algorithms for various problems in geometric computation and in vision metrology, together with mathematical justification and statistical analysis allowing thorough evaluation.

The book aims at enabling researchers, software developers, and practitioners in the photogrammetric and GIS industry to design, write, and test their own algorithms and application software using statistically founded concepts to obtain optimal solutions and to realize self-diagnostics within algorithms. This is essential when applying vision techniques in practice. The material of the book can serve as a source for different levels of undergraduate and graduate courses in photogrammetry, computer vision, and computer graphics, and for research and development in statistically based geometric computer vision methods.

The sixteen chapters of the book are self-contained, are illustrated with numerous figures, have exercises, and are supported by an appendix and an index. Many of the examples and exercises can be verified or solved using the MATLAB routines available on the home page of the book, which also contains solutions to some of the exercises.

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