

Preface

The research of computer vision is a systematic and inter-discipline science. And one of the most important goals is to endow a vision system with the ability to sense and cognize its environment from the two-dimensional image or image sequences. The critical step towards that goal is to build an appropriate imaging model for the system and estimate its parameters as accurately as possible, which is generally termed as camera calibration.

In practice, the image data are infected by various noises. Furthermore, the sensor model itself is generally obtained with some kind of approximation. As a result, it is difficult to realize an accurate, reliable and robust vision system due to the error accumulations. In the past decades, many distinct techniques have been suggested to cope with this problem, making use of either different physical features or geometric constraints, such as coplanarity, orthogonality and collinearity, etc.

The purpose of this book is to present our work within the field of camera calibration and 3D reconstruction. Several possible solutions for the related problems are discussed. Here, various cues are employed, including different planar patterns, plane-based homographic and fundamental matrix. The involved system ranges from passive vision system to active vision system, including structured light system and catadioptric system.

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