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Automatic Calibration and Reconstruction for Active Vision Systems

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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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NanJing, China

Beiwei Zhang

Contents

1	Introduction	1
1.1	Vision Framework	1
1.2	Background	2
1.2.1	Calibrated Reconstruction	3
1.2.2	Uncalibrated 3D Reconstruction	9
1.3	Scope	11
1.3.1	System Calibration	11
1.3.2	Plane-based Homography	12
1.3.3	Structured Light System	12
1.3.4	Omni-Directional Vision System	13
1.4	Objectives	13
1.5	Book Structures	14
2	System Description	17
2.1	System Introduction	17
2.1.1	Structured Light System	17
2.1.2	Omni-Directional Vision System	19
2.2	Component Modeling	19
2.2.1	Convex Mirror	19
2.2.2	Camera Model	21
2.2.3	Projector Model	22
2.3	Pattern Coding Strategy	24
2.3.1	Introduction	24
2.3.2	Color-Encoded Light Pattern	24
2.3.3	Decoding the Light Pattern	26
2.4	Some Preliminaries	27
2.4.1	Notations and Definitions	27
2.4.2	Cross Ratio	28
2.4.3	Plane-Based Homography	29
2.4.4	Fundamental Matrix	31

- 3 Static Calibration** 35
 - 3.1 Calibration Theory 35
 - 3.2 Polygon-based Calibration 37
 - 3.2.1 Design of the Planar Pattern 37
 - 3.2.2 Solving the Vanishing Line 37
 - 3.2.3 Solving the Projection of a Circle 38
 - 3.2.4 Solving the Projection of Circular Point 39
 - 3.2.5 Algorithm 39
 - 3.2.6 Discussion 39
 - 3.3 Intersectant-Circle-based Calibration 40
 - 3.3.1 Planar Pattern Design 40
 - 3.3.2 Solution for The Circular Point 40
 - 3.4 Concentric-Circle-based Calibration 42
 - 3.4.1 Some Preliminaries 43
 - 3.4.2 The Polynomial Eigenvalue Problem 45
 - 3.4.3 Orthogonality-Based Algorithm 46
 - 3.4.4 Experiments 47
 - 3.5 Line-Based Distortion Correction 52
 - 3.5.1 The Distortion Model 53
 - 3.5.2 The Correction Procedure 54
 - 3.5.3 Examples 55
 - 3.6 Summary 55
- 4 Homography-Based Dynamic Calibration** 57
 - 4.1 Problem Statement 57
 - 4.2 System Constraints 60
 - 4.2.1 Two Propositions 60
 - 4.2.2 System Constraints 62
 - 4.3 Calibration Algorithm 63
 - 4.3.1 Solution for the Scale Factor 63
 - 4.3.2 Solutions for the Translation Vector 64
 - 4.3.3 Solution for Rotation Matrix 67
 - 4.3.4 Implementation Procedure 68
 - 4.4 Error Analyses 70
 - 4.4.1 Errors in the Homographic Matrix 70
 - 4.4.2 Errors in the Translation Vector 73
 - 4.4.3 Errors in the Rotation Matrix 74
 - 4.5 Experiments Study 75
 - 4.5.1 Computer Simulation 75
 - 4.5.2 Real Data Experiment 81
 - 4.6 Summary 85
- 5 3D Reconstruction with Image-to-World Transformation** 93
 - 5.1 Introduction 93
 - 5.2 Image-to-World Transformation Matrix 95

- 5.3 Two-Known-Plane Based Method 97
 - 5.3.1 Static Calibration 97
 - 5.3.2 Determining the On-Line Homography 100
 - 5.3.3 Euclidean 3D Reconstruction 100
 - 5.3.4 Configuration of the Two Scene Planes 101
 - 5.3.5 Computational Complexity Study 102
 - 5.3.6 Reconstruction Examples 103
- 5.4 One-Known-Plane Based Method 106
 - 5.4.1 Calibration Tasks 106
 - 5.4.2 Generic Homography 107
 - 5.4.3 Dynamic Calibration 108
 - 5.4.4 Reconstruction Procedure 112
 - 5.4.5 Reconstruction Examples 112
- 5.5 Summary 115
- 6 Catadioptric Vision System 117**
 - 6.1 Introduction 117
 - 6.1.1 Wide Field-of-View System 117
 - 6.1.2 Calibration of Omni-Directional Vision System 121
 - 6.1.3 Test Example 122
 - 6.2 Panoramic Stereoscopic System 123
 - 6.2.1 System Configuration 123
 - 6.2.2 Co-axis Installation 125
 - 6.2.3 System Model 126
 - 6.2.4 Epipolar Geometry and 3D Reconstruction 128
 - 6.2.5 Calibration Procedure 129
 - 6.3 Parabolic Camera System 132
 - 6.3.1 System Configuration 132
 - 6.3.2 System Modeling 133
 - 6.3.3 Calibration with Lifted-Fundamental-Matrix 134
 - 6.3.4 Calibration Based on Homographic Matrix 139
 - 6.3.5 Polynomial Eigenvalue Problem 142
 - 6.4 Hyperbolic Camera System 146
 - 6.4.1 System Structure 146
 - 6.4.2 Imaging Process and Back Projection 147
 - 6.4.3 Polynomial Eigenvalue Problem 148
 - 6.5 Summary 149
- 7 Conclusions and Future Expectation 151**
 - 7.1 Conclusions 151
 - 7.2 Future Expectations 153
- References 155**