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Autore	Florczyk Stefan
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Nota di contenuto	Robot Vision; Contents; List of Figures; Symbols and Abbreviations; 1 Introduction; 2 Image Processing; 2.1 Color Models; 2.2 Filtering; 2.2.1 Kalman Filter; 2.2.2 Gabor Filter; 2.2.3 Application of the Gabor Filter; 2.3 Morphological Image Processing; 2.3.1 The Structuring Element; 2.3.2 Erosion; 2.3.3 Dilation; 2.4 Edge Detection; 2.5 Skeleton Procedure; 2.6 The Segmentation of Image Regions; 2.7 Threshold; 3 Navigation; 3.1 Coordinate Systems; 3.2 Representation Forms; 3.2.1 Grid-based Maps; 3.2.2 Graph-based Maps; 3.3 Path Planning; 3.3.1 Topological Path Planning; 3.3.2 Behavior-based Path Execution; 3.3.3 Global Path Planning; 3.3.4 Local Path Planning; 3.3.5 The Combination of Global and Local Path Planning; 3.4 The Architecture of a Multilevel Map Representation; 3.5 Self-localization; 4 Vision Systems; 4.1 The Human Visual Apparatus; 4.1.1 The Functionality; 4.1.2 The Visual Cortex; 4.2 The Human Visual Apparatus as Model for Technical Vision Systems; 4.2.1 Attention Control; 4.2.2 Passive Vision; 4.2.3 Active Vision; 4.2.4 Space-variant Active Vision; 4.3 Camera Types; 4.3.1 Video Cameras; 4.3.2 CCD

Sensors; 4.3.3 Analog Metric Cameras; 5 CAD
5.1 Constructive Solid Geometry5.2 Boundary-representation Schema (B-rep); 5.3 Approximate Models; 5.3.1 Octrees; 5.3.2 Extended Octrees; 5.3.3 Voxel Model; 5.4 Hybrid Models; 5.5 Procedures to Convert the Models; 5.6 The Use of CAD in Computer Vision; 5.6.1 The Approximation of the Object Contour; 5.6.2 Cluster Search in Transformation Space with Adaptive Subdivision; 5.6.3 The Generation of a Pseudo-B-rep Representation from Sensor Data; 5.7 Three-dimensional Reconstruction with Alternative Approaches; 5.7.1 Partial Depth Reconstruction
5.7.2 Three-dimensional Reconstruction with Edge Gradients5.7.3 Semantic Reconstruction; 5.7.4 Mark-based Procedure; 6 Stereo Vision; 6.1 Stereo Geometry; 6.2 The Projection of the Scene Point; 6.3 The Relative Motion of the Camera; 6.4 The Estimation of the Fundamental Matrix B; 6.5 Image Rectification; 6.6 Ego-motion Estimation; 6.7 Three-dimensional Reconstruction by Known Internal Parameters; 6.8 Three-dimensional Reconstruction by Unknown Internal and External Parameters; 6.8.1 Three-dimensional Reconstruction with Two Uncalibrated Cameras
6.8.2 Three-dimensional Reconstruction with Three or More Cameras6.9 Stereo Correspondence; 6.9.1 Correlation-based Stereo Correspondence; 6.9.2 Feature-based Stereo Correspondence; 6.10 Image-sequence Analysis; 6.11 Three-dimensional Reconstruction from Image Sequences with the Kalman Filter; 7 Camera Calibration; 7.1 The Calibration of One Camera from a Known Scene; 7.1.1 Pinhole-camera Calibration; 7.1.2 The Determination of the Lens Distortion; 7.2 Calibration of Cameras in Robot-vision Systems; 7.2.1 Calibration with Moving Object; 7.2.2 Calibration with Moving Camera
8 Self-learning Algorithms

Sommario/riassunto

The book is intended for advanced students in physics, mathematics, computer science, electrical engineering, robotics, engine engineering and for specialists in computer vision and robotics on the techniques for the development of vision-based robot projects. It focusses on autonomous and mobile service robots for indoor work, and teaches the techniques for the development of vision-based robot projects. A basic knowledge of informatics is assumed, but the basic introduction helps to adjust the knowledge of the reader accordingly. A practical treatment of the material enables a comprehensi
