
Multiple View Geometry In Computer Vision

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Multiple View Geometry in Computer Vision *Cambridge University Press*

A basic problem in computer vision is to understand the structure of a real world scene given several images of it. Techniques for solving this problem are taken from projective geometry and photogrammetry. Here, the authors cover the geometric principles and their algebraic representation in terms of camera projection matrices, the fundamental matrix and the trifocal tensor. The theory and methods of computation of these entities are discussed with real examples, as is their use in the reconstruction of scenes from multiple images. The new edition features an extended introduction covering the key ideas in the book (which itself has been updated with additional examples and appendices) and significant new results which have appeared since the first edition. Comprehensive background material is provided, so readers familiar with linear algebra and basic numerical methods can understand the projective geometry and estimation algorithms presented, and implement the algorithms directly from the book.

Multiple View Geometry in Computer Vision *Cambridge University Press*

How to reconstruct scenes from images using geometry and algebra, with applications to computer vision.

Multiple View Geometry in Computer Vision

How to reconstruct scenes from images using geometry and algebra, with applications to computer vision.

Photogrammetric Computer Vision

Statistics, Geometry, Orientation and Reconstruction

Springer

This textbook offers a statistical view on the geometry of multiple view analysis, required for camera calibration and orientation and for geometric scene reconstruction based on geometric image features. The authors have backgrounds in geodesy and also long experience with development and research in computer vision, and this is the first book to present a joint approach from the converging fields of photogrammetry and computer vision. Part I of the book provides an introduction to estimation theory, covering aspects such as Bayesian estimation, variance components, and sequential estimation, with a focus on the statistically sound diagnostics of estimation results essential in vision metrology. Part II provides tools for 2D and 3D geometric reasoning using projective geometry. This includes oriented projective geometry and tools for statistically optimal estimation and test of geometric entities and transformations and their relations, tools that are useful also in the context of uncertain reasoning in point clouds. Part III is devoted to modelling the geometry of single and multiple cameras, addressing calibration and orientation, including statistical evaluation and reconstruction of corresponding scene features and surfaces based on geometric image features. The authors provide algorithms for various geometric computation problems in vision metrology, together with mathematical justifications and statistical analysis, thus enabling thorough evaluations. The chapters are self-contained with numerous figures and exercises,

and they are supported by an appendix that explains the basic mathematical notation and a detailed index. The book can serve as the basis for undergraduate and graduate courses in photogrammetry, computer vision, and computer graphics. It is also appropriate for researchers, engineers, and software developers in the photogrammetry and GIS industries, particularly those engaged with statistically based geometric computer vision methods.

OpenCV 3 Computer Vision with Python Cookbook

Leverage the power of OpenCV 3 and Python to build computer vision applications *Packt Publishing Ltd*

Recipe-based approach to tackle the most common problems in Computer Vision by leveraging the functionality of OpenCV using Python APIs Key Features ●Build computer vision applications with OpenCV functionality via Python API ●Get to grips with image processing, multiple view geometry, and machine learning ●Learn to use deep learning models for image classification, object detection, and face recognition Book Description OpenCV 3 is a native cross-platform library for computer vision, machine learning, and image processing. OpenCV's convenient high-level APIs hide very powerful internals designed for computational efficiency that can take advantage of multicore and GPU processing. This book will help you tackle increasingly challenging computer vision problems by providing a number of recipes that you can use to improve your applications. In this book, you will learn how to process an image by manipulating pixels and analyze an image using histograms. Then, we'll show

you how to apply image filters to enhance image content and exploit the image geometry in order to relay different views of a pictured scene. We'll explore techniques to achieve camera calibration and perform a multiple-view analysis. Later, you'll work on reconstructing a 3D scene from images, converting low-level pixel information to high-level concepts for applications such as object detection and recognition. You'll also discover how to process video from files or cameras and how to detect and track moving objects. Finally, you'll get acquainted with recent approaches in deep learning and neural networks. By the end of the book, you'll be able to apply your skills in OpenCV to create computer vision applications in various domains. What you will learn

- Get familiar with low-level image processing methods
- See the common linear algebra tools needed in computer vision
- Work with different camera models and epipolar geometry
- Find out how to detect interesting points in images and compare them
- Binarize images and mask out regions of interest
- Detect objects and track them in videos

Who this book is for
This book is for developers who have a basic knowledge of Python. If you are aware of the basics of OpenCV and are ready to build computer vision systems that are smarter, faster, more complex, and more practical than the competition, then this book is for you.

An Invitation to 3-D Vision

From Images to Geometric Models *Springer Science & Business Media*

This book introduces the geometry of 3-D vision, that is, the

reconstruction of 3-D models of objects from a collection of 2-D images. It details the classic theory of two view geometry and shows that a more proper tool for studying the geometry of multiple views is the so-called rank consideration of the multiple view matrix. It also develops practical reconstruction algorithms and discusses possible extensions of the theory.

Computer Vision

Models, Learning, and Inference *Cambridge University Press*

A modern treatment focusing on learning and inference, with minimal prerequisites, real-world examples and implementable algorithms.

Multiple View Geometry in Computer Vision

How to reconstruct scenes from images using geometry and algebra, with applications to computer vision.

Computer Vision -- ACCV 2007

8th Asian Conference on Computer Vision, Tokyo, Japan, November 18-22, 2007, Proceedings, Part I *Springer*

This title is part of a two volume set that constitutes the refereed proceedings of the 8th Asian Conference on Computer Vision, ACCV 2007. Coverage in this volume includes shape and texture, face and gesture, camera networks, face/gesture/action detection and recognition, learning, motion and tracking, human pose estimation, matching, face/gesture/action detection and recognition, low level vision and photometry, motion and

tracking, human detection, and segmentation.

Computer Vision

Algorithms and Applications *Springer Science & Business Media*

Computer Vision: Algorithms and Applications explores the variety of techniques commonly used to analyze and interpret images. It also describes challenging real-world applications where vision is being successfully used, both for specialized applications such as medical imaging, and for fun, consumer-level tasks such as image editing and stitching, which students can apply to their own personal photos and videos. More than just a source of “recipes,” this exceptionally authoritative and comprehensive textbook/reference also takes a scientific approach to basic vision problems, formulating physical models of the imaging process before inverting them to produce descriptions of a scene. These problems are also analyzed using statistical models and solved using rigorous engineering techniques. Topics and features: structured to support active curricula and project-oriented courses, with tips in the Introduction for using the book in a variety of customized courses; presents exercises at the end of each chapter with a heavy emphasis on testing algorithms and containing numerous suggestions for small mid-term projects; provides additional material and more detailed mathematical topics in the Appendices, which cover linear algebra, numerical techniques, and Bayesian estimation theory; suggests additional reading at the end of each chapter, including the latest research in each

sub-field, in addition to a full Bibliography at the end of the book; supplies supplementary course material for students at the associated website, <http://szeliski.org/Book/>. Suitable for an upper-level undergraduate or graduate-level course in computer science or engineering, this textbook focuses on basic techniques that work under real-world conditions and encourages students to push their creative boundaries. Its design and exposition also make it eminently suitable as a unique reference to the fundamental techniques and current research literature in computer vision.

Computer Vision for Visual Effects *Cambridge University Press*

This book explores the fundamental computer vision principles and state-of-the-art algorithms used to create cutting-edge visual effects for movies and television. It describes classical computer vision algorithms and recent developments, features more than 200 original images, and contains in-depth interviews with Hollywood visual effects artists that tie the mathematical concepts to real-world filmmaking.

Image-Based Modeling *Springer Science & Business Media*

“This book guides you in the journey of 3D modeling from the theory with elegant mathematics to applications with beautiful 3D model pictures. Written in a simple, straightforward, and concise manner, readers will learn the state of the art of 3D reconstruction and modeling.” —Professor Takeo Kanade, Carnegie Mellon University The computer vision and graphics communities use different terminologies for the same ideas. This

book provides a translation, enabling graphics researchers to apply vision concepts, and vice-versa, independence of chapters allows readers to directly jump into a specific chapter of interest, compared to other texts, gives more succinct treatment overall, and focuses primarily on vision geometry. Image-Based Modeling is for graduate students, researchers, and engineers working in the areas of computer vision, computer graphics, image processing, robotics, virtual reality, and photogrammetry.

Three-dimensional Computer Vision

A Geometric Viewpoint *MIT Press*

This monograph by one of the world's leading vision researchers provides a thorough, mathematically rigorous exposition of a broad and vital area in computer vision: the problems and techniques related to three-dimensional (stereo) vision and motion. The emphasis is on using geometry to solve problems in stereo and motion, with examples from navigation and object recognition. Faugeras takes up such important problems in computer vision as projective geometry, camera calibration, edge detection, stereo vision (with many examples on real images), different kinds of representations and transformations (especially 3-D rotations), uncertainty and methods of addressing it, and object representation and recognition. His theoretical account is illustrated with the results of actual working programs. Three-Dimensional Computer Vision proposes solutions to problems arising from a specific robotics scenario in which a system must perceive and act. Moving about an unknown environment, the system has to avoid static and mobile obstacles, build models

of objects and places in order to be able to recognize and locate them, and characterize its own motion and that of moving objects, by providing descriptions of the corresponding three-dimensional motions. The ideas generated, however, can be used in different settings, resulting in a general book on computer vision that reveals the fascinating relationship of three-dimensional geometry and the imaging process. Olivier Faugeras is Research Director of the Computer Vision and Robotics Laboratory at INRIA Sophia-Antipolis and a Professor of Applied Mathematics at the Ecole Polytechnique in Paris.

Reproducible Research in Pattern Recognition

First International Workshop, RRPR 2016, Cancún, Mexico, December 4, 2016, Revised Selected Papers *Springer*

This book constitutes the thoroughly refereed post-proceedings of the First International Workshop on Reproducible Research in Pattern Recognition, RRPR 2016, held in Cancún, Mexico, in December 2016. The 12 revised full papers, among them 2 invited talks, presented were carefully reviewed and selected from 16 submissions. They focus on pattern recognition algorithms; reproducible research frameworks; reproducible research results, previous works on reproducible research.

Learning OpenCV 3

Computer Vision in C++ with the OpenCV Library *"O'Reilly Media, Inc."*

"This book provides a working guide to the C++ Open Source

Computer Vision Library (OpenCV) version 3.x and gives a general background on the field of computer vision sufficient to help readers use OpenCV effectively."--Preface.

Programming Computer Vision with Python

Tools and algorithms for analyzing images "O'Reilly Media, Inc."

If you want a basic understanding of computer vision's underlying theory and algorithms, this hands-on introduction is the ideal place to start. You'll learn techniques for object recognition, 3D reconstruction, stereo imaging, augmented reality, and other computer vision applications as you follow clear examples written in Python. *Programming Computer Vision with Python* explains computer vision in broad terms that won't bog you down in theory. You get complete code samples with explanations on how to reproduce and build upon each example, along with exercises to help you apply what you've learned. This book is ideal for students, researchers, and enthusiasts with basic programming and standard mathematical skills. Learn techniques used in robot navigation, medical image analysis, and other computer vision applications Work with image mappings and transforms, such as texture warping and panorama creation Compute 3D reconstructions from several images of the same scene Organize images based on similarity or content, using clustering methods Build efficient image retrieval techniques to search for images based on visual content Use algorithms to classify image content and recognize objects Access the popular OpenCV library through a Python interface

The Geometry of Multiple Images

The Laws that Govern the Formation of Multiple Images of a Scene and Some of Their Applications MIT Press

This book formalizes and analyzes the relations between multiple views of a scene from the perspective of various types of geometries. A key feature is that it considers Euclidean and affine geometries as special cases of projective geometry. Over the last forty years, researchers have made great strides in elucidating the laws of image formation, processing, and understanding by animals, humans, and machines. This book describes the state of knowledge in one subarea of vision, the geometric laws that relate different views of a scene. Geometry, one of the oldest branches of mathematics, is the natural language for describing three-dimensional shapes and spatial relations. Projective geometry, the geometry that best models image formation, provides a unified framework for thinking about many geometric problems are relevant to vision. The book formalizes and analyzes the relations between multiple views of a scene from the perspective of various types of geometries. A key feature is that it considers Euclidean and affine geometries as special cases of projective geometry. Images play a prominent role in computer communications. Producers and users of images, in particular three-dimensional images, require a framework for stating and solving problems. The book offers a number of conceptual tools and theoretical results useful for the design of machine vision algorithms. It also illustrates these tools and results with many examples of real applications.

Camera Models and Fundamental Concepts Used in Geometric Computer Vision *Now Publishers Inc*

Camera Models and Fundamental Concepts Used in Geometric Computer Vision surveys the image acquisition methods used in computer vision and especially, of the vast number of camera models that have been proposed and investigated over the years, and points out similarities between different models.

Introductory Techniques for 3-D Computer Vision

This text provides readers with a starting point to understand and investigate the literature of computer vision, listing conferences, journals and Internet sites.

Computer Vision

A Modern Approach *Pearson Education*

Appropriate for upper-division undergraduate and graduate level courses in computer vision found in departments of computer science, computer engineering and electrical engineering, this book offers a treatment of modern computer vision methods.

Vision Algorithms: Theory and Practice

International Workshop on Vision Algorithms Corfu, Greece, September 21-22, 1999 Proceedings *Springer Science & Business Media*

This book constitutes the thoroughly refereed post-workshop proceedings of the International Workshop on Vision Algorithms held in Corfu, Greece in September 1999 in conjunction with

ICCV'99. The 15 revised full papers presented were carefully reviewed and selected from 65 submissions; each paper is complemented by a brief transcription of the discussion that followed its presentation. Also included are two invited contributions and two expert reviews as well as a panel discussion. The volume spans the whole range of algorithms for geometric vision. The authors and volume editors succeeded in providing added value beyond a mere collection of papers and made the volume a state-of-the-art survey of their field.

Visibility Algorithms in the Plane *Cambridge University Press*

A human observer can effortlessly identify visible portions of geometric objects present in the environment. However, computations of visible portions of objects from a viewpoint involving thousands of objects is a time consuming task even for high speed computers. To solve such visibility problems, efficient algorithms have been designed. This book presents some of these visibility algorithms in two dimensions. Specifically, basic algorithms for point visibility, weak visibility, shortest paths, visibility graphs, link paths and visibility queries are all discussed. Several geometric properties are also established through lemmas and theorems. With over 300 figures and hundreds of exercises, this book is ideal for graduate students and researchers in the field of computational geometry. It will also be useful as a reference for researchers working in algorithms, robotics, computer graphics and geometric graph theory, and some algorithms from the book can be used in a first course in computational geometry.

Multi-View Stereo

A Tutorial *Foundations and Trends (R) in Computer Graphics and Vision*

Presents a hands-on view of the field of multi-view stereo with a focus on practical algorithms. It frames the multiview stereo problem as an image/geometry consistency optimization problem and describes its main two ingredients: robust implementations of photometric consistency measures and efficient optimization algorithms.

Multiple View Geometry in Computer Vision

Computer Vision - ACCV 2007

8th Asian Conference on Computer Vision, Tokyo, Japan, November 18-22, 2007, Proceedings, Part II *Springer*

This title is part of a two volume set that constitutes the refereed proceedings of the 8th Asian Conference on Computer Vision, ACCV 2007. Coverage includes shape and texture, image and video processing, face and gesture, tracking, camera networks, learning, motion and tracking, retrieval and search, human pose estimation, matching, face/gesture/action detection and recognition, low level vision and photometry, motion and tracking, human detection, and segmentation.

Image Processing and Analysis *Cengage Learning*

Readers discover a contemporary treatment of image processing that balances a broad coverage of major subject areas with in-

depth examination of the most foundational topics. IMAGE PROCESSING AND ANALYSIS offers an accessible presentation that provides higher-level discussions to challenge the most advanced readers. The book effectively balances key topics from the field of image processing in a format that gradually progresses from easy to more challenging material, while consistently reinforcing a fundamental understanding of the core concepts. The book's hands-on learning approach and full-color presentation allows readers to begin working with images immediately. The book encourages programming as it incorporates algorithmic details and hints, using detailed pseudocode to facilitate an understanding of algorithms and aid in implementation. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Computer Vision *Pearson*

Using a progressive intuitive/mathematical approach, this introduction to computer vision provides necessary theory and examples for practitioners who work in fields where significant information must be extracted automatically from images--including those interested in multimedia, art and design, geographic information systems, and image databases, in addition to the traditional areas of automation, image science, medical imaging, remote sensing and computer cartography. The book provides a basic set of fundamental concepts, (representations of image information, extraction of 3D scene information from 2D images, etc.) algorithms for analyzing images, and discusses some of the exciting evolving application

areas of computer vision. The approach is language and software independent, and includes two significant commercial case studies. Imaging and Image Representation. Binary Image Analysis. Pattern Recognition Concepts. Filtering and Enhancing Images. Color and Shading. Texture. Content-Based Image Retrieval. Motion from 2D Image Sequences. Image Segmentation. Matching in 2D. Perceiving 3D from 2D Images. 3D Sensing and Object Pose Computation. 3D Models and Matching. Virtual Reality. Case Studies. For practitioners in any field where information must be extracted automatically from images.

Algebraic Frames for the Perception-Action Cycle

International Workshop, AFPAC'97, Kiel, Germany, September 8-9, 1997, Proceedings *Springer Science & Business Media*

The book constitutes the refereed proceedings of the International Workshop on Algebraic Frames for the Perception-Action Cycle, AFPAC '97, held in Kiel, Germany, in September 1997. The volume presents 12 revised full papers carefully reviewed and selected for inclusion in the book. Also included are 10 full invited papers by leading researchers in the area providing a representative state-of-the-art assessment of this rapidly growing field. The papers are organized in topical sections on PAC systems, low level and early vision, recognition of visual structure, processing of 3D visual space, representation and shape perception, inference and action, and visual and motor neurocomputation.

Computer Vision

Detection, Recognition and Reconstruction *Springer*

Computer vision is the science and technology of making machines that see. It is concerned with the theory, design and implementation of algorithms that can automatically process visual data to recognize objects, track and recover their shape and spatial layout. The International Computer Vision Summer School - ICVSS was established in 2007 to provide both an objective and clear overview and an in-depth analysis of the state-of-the-art research in Computer Vision. The courses are delivered by world renowned experts in the field, from both academia and industry, and cover both theoretical and practical aspects of real Computer Vision problems. The school is organized every year by University of Cambridge (Computer Vision and Robotics Group) and University of Catania (Image Processing Lab). Different topics are covered each year. A summary of the past Computer Vision Summer Schools can be found at: <http://www.dmi.unict.it/icvss> This edited volume contains a selection of articles covering some of the talks and tutorials held during the first two editions of the school on topics such as Recognition, Registration and Reconstruction. The chapters provide an in-depth overview of these challenging areas with key references to the existing literature.

Computer Vision - ACCV 2006

7th Asian Conference on Computer Vision, Hyderabad, India, January 13-16, 2006, Proceedings *Springer Science &*

Business Media

Computer Vision

From 3d Reconstruction to Visual Recognition *Morgan & Claypool*

When a 3-dimensional world is projected onto a 2-dimensional image, such as the human retina or a photograph, reconstructing back the layout and contents of the real-world becomes an ill-posed problem that is extremely difficult to solve. Humans possess the remarkable ability to navigate and understand the visual world by solving the inversion problem going from 2D to 3D. Computer Vision seeks to imitate such abilities of humans to recognize objects, navigate scenes, reconstruct layouts, and understand the geometric space and semantic meaning of the visual world. These abilities are critical in many applications including robotics, autonomous driving and exploration, photo organization, image, or video retrieval, and human-computer interaction. This book delivers a systematic overview of computer vision, comparable to that presented in an advanced graduate level class. The authors emphasize two key issues in modeling vision: space and meaning, and focus upon the main problems vision needs to solve, including: * mapping out the 3D structure of objects and scenes* recognizing objects* segmenting objects* recognizing meaning of scenes* understanding movements of humans. Motivated by these important problems and centered on the understanding of space and meaning, the book explores the fundamental theories and important algorithms of computer vision, starting from the analysis of 2D images, and culminating

in the holistic understanding of a 3D scene

Digit-Serial Computation *Springer Science & Business Media*

Digital signal processing (DSP) is used in a wide range of applications such as speech, telephone, mobile radio, video, radar and sonar. The sample rate requirements of these applications range from 10 KHz to 100 MHz. Real time implementation of these systems requires design of hardware which can process signal samples as these are received from the source, as opposed to storing them in buffers and processing them in batch mode. Efficient implementation of real time hardware for DSP applications requires study of families of architectures and implementation styles out of which an appropriate architecture can be selected for a specified application. To this end, the digit-serial implementation style is proposed as an appropriate design methodology for cases where bit-serial systems cannot meet the sample rate requirements, and bit-parallel systems require excessive hardware. The number of bits processed in a clock cycle is referred to as the digit-size. The hardware complexity and the achievable sample rate increase with increase in the digit-size. As special cases, a digit serial system is reduced to bit-serial or bit-parallel when the digit-size is selected to equal one or the word-length, respectively. A family of implementations can be obtained by changing the digit-size parameter, thus permitting an optimal trade-off between throughput and size. Because of their structured architecture, digit-serial designs lend themselves to automatic compilation from algorithmic descriptions. An implementation of this design methodology, the Parsifal silicon compiler was developed at the

General Electric Corporate Research and Development laboratory.

Emerging Topics in Computer Vision *Prentice Hall*

Gerard Medioni and Sing Bing Kang present advances in computer vision such as camera calibration, multi-view geometry, and face detection, and introduce important new topics such as vision for special effects and the tensor voting framework. They begin with the fundamentals, cover select applications in detail, and introduce two popular approaches to computer vision programming.

Mastering OpenCV 4

A comprehensive guide to building computer vision and image processing applications with C++, 3rd Edition *Packt Publishing Ltd*

Mastering OpenCV, now in its third edition, targets computer vision engineers taking their first steps toward mastering OpenCV. Keeping the mathematical formulations to a solid but bare minimum, the book delivers complete projects from ideation to running code, targeting current hot topics in computer vision such as face recognition, landmark ...

Concise Computer Vision

An Introduction into Theory and Algorithms *Springer Science & Business Media*

This textbook provides an accessible general introduction to the

essential topics in computer vision. Classroom-tested programming exercises and review questions are also supplied at the end of each chapter. Features: provides an introduction to the basic notation and mathematical concepts for describing an image and the key concepts for mapping an image into an image; explains the topologic and geometric basics for analysing image regions and distributions of image values and discusses identifying patterns in an image; introduces optic flow for representing dense motion and various topics in sparse motion analysis; describes special approaches for image binarization and segmentation of still images or video frames; examines the basic components of a computer vision system; reviews different techniques for vision-based 3D shape reconstruction; includes a discussion of stereo matchers and the phase-congruency model for image features; presents an introduction into classification and learning.

Geometry and Analysis of Projective Spaces

A Guided Tour of Computer Vision *Addison Wesley Publishing Company*

An introduction to computer vision, covering the structure and properties of the visual world. This concise guide stresses fundamental concepts, and also provides details and pointers with respect to recent developments. The author pursues the narrow view of vision covering the structure and properties of the visual world, thereby providing a lucid introduction for the novice and a fresh perspective to the expert.

Computer Vision -- ECCV 2010

11th European Conference on Computer Vision, Heraklion, Crete, Greece, September 5-11, 2010, Proceedings *Springer Science & Business Media*

The six-volume set comprising LNCS volumes 6311 until 6313 constitutes the refereed proceedings of the 11th European Conference on Computer Vision, ECCV 2010, held in Heraklion, Crete, Greece, in September 2010. The 325 revised papers presented were carefully reviewed and selected from 1174 submissions. The papers are organized in topical sections on object and scene recognition; segmentation and grouping; face, gesture, biometrics; motion and tracking; statistical models and visual learning; matching, registration, alignment; computational imaging; multi-view geometry; image features; video and event characterization; shape representation and recognition; stereo; reflectance, illumination, color; medical image analysis.

Computer Vision - ECCV 2002

7th European Conference on Computer Vision, Copenhagen, Denmark, May 28-31, 2002, Proceedings, Part I *Springer*

Premiering in 1990 in Antibes, France, the European Conference on Computer Vision, ECCV, has been held biennially at venues all around Europe. These conferences have been very successful, making ECCV a major event to the computer vision community. ECCV 2002 was the seventh in the series. The privilege of organizing it was shared by three universities: The IT University

of Copenhagen, the University of Copenhagen, and Lund University, with the conference venue in Copenhagen. These universities lie geographically close in the vivid Oresund region, which lies partly in Denmark and partly in Sweden, with the newly built bridge (opened summer 2000) crossing the sound that formerly divided the countries. We are very happy to report that this year's conference attracted more papers than ever before, with around 600 submissions. Still, together with the conference board, we decided to keep the tradition of holding ECCV as a single track conference. Each paper was anonymously refereed by three different reviewers. For the final selection, for the first time for ECCV, a system with area chairs was used. These met with the program chairs in Lund for two days in February 2002 to select what became 45 oral presentations and 181 posters. Also at this meeting the selection was made without knowledge of the authors' identity.

Computer Vision - ECCV 2016

14th European Conference, Amsterdam, The Netherlands, October 11-14, 2016, Proceedings, Part III *Springer*

The eight-volume set comprising LNCS volumes 9905-9912 constitutes the refereed proceedings of the 14th European Conference on Computer Vision, ECCV 2016, held in Amsterdam, The Netherlands, in October 2016. The 415 revised papers presented were carefully reviewed and selected from 1480 submissions. The papers cover all aspects of computer vision and pattern recognition such as 3D computer vision; computational photography, sensing and display; face and gesture; low-level

vision and image processing; motion and tracking; optimization methods; physics-based vision, photometry and shape-from-X; recognition: detection, categorization, indexing, matching; segmentation, grouping and shape representation; statistical methods and learning; video: events, activities and surveillance;

applications. They are organized in topical sections on detection, recognition and retrieval; scene understanding; optimization; image and video processing; learning; action activity and tracking; 3D; and 9 poster sessions.