

Image Feature Detectors And Descriptors Foundations And Applications Studies In Computational Intelligence

Feature Extraction for Image Processing and Computer Vision is an essential guide to the implementation of image processing and computer vision techniques, with tutorial introductions and sample code in MATLAB and Python. Algorithms are presented and fully explained to enable complete understanding of the methods and techniques demonstrated. As one reviewer noted, "The main strength of the proposed book is the link between theory and exemplar code of the algorithms." Essential background theory is carefully explained. This text gives students and researchers in image processing and computer vision a complete introduction to classic and state-of-the-art methods in feature extraction together with practical guidance on their implementation. The only text to concentrate on feature extraction with working implementation and worked through mathematical derivations and algorithmic methods A thorough overview of available feature extraction methods including essential background theory, shape methods, texture and deep learning Up to date coverage of interest point detection, feature extraction and description and image representation (including frequency domain and colour) Good balance between providing a mathematical background and practical implementation Detailed and explanatory of algorithms in MATLAB and Python

The two-volume set LNCS 10132 and 10133 constitutes the thoroughly refereed proceedings of the 23rd International Conference on Multimedia Modeling, MMM 2017, held in Reykjavik, Iceland, in January 2017. Of the 149 full papers submitted, 36 were selected for oral presentation and 33 for poster presentation; of the 34 special session papers submitted, 24 were selected for oral presentation and 2 for poster presentation; in addition, 5 demonstrations were accepted from 8 submissions, and all 7 submissions to VBS 2017. All papers presented were carefully reviewed and selected from 198 submissions. MMM is a leading international conference for researchers and industry practitioners for sharing new ideas, original research results and practical development experiences from all MMM related areas, broadly falling into three categories: multimedia content analysis; multimedia signal processing and communications; and multimedia applications and services.

The two-volume set LNCS 11751 and 11752 constitutes the refereed proceedings of the 20th International Conference on Image Analysis and Processing, ICIAP 2019, held in Trento, Italy, in September 2019. The 117 papers presented were carefully reviewed and selected from 207 submissions. The papers cover both classic and the most recent trends in image processing, computer vision, and pattern recognition, addressing both theoretical and applicative aspects. They

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are organized in the following topical sections: Video Analysis and Understanding; Pattern Recognition and Machine Learning; Deep Learning; Multiview Geometry and 3D Computer Vision; Image Analysis, Detection and Recognition; Multimedia; Biomedical and Assistive Technology; Digital Forensics; Image processing for Cultural Heritage.

This volume constitutes the refereed proceedings of the 21st Scandinavian Conference on Image Analysis, SCIA 2019, held in Norrköping, Sweden, in June 2019. The 40 revised papers presented were carefully reviewed and selected from 63 submissions. The contributions are structured in topical sections on Deep convolutional neural networks; Feature extraction and image analysis; Matching, tracking and geometry; and Medical and biomedical image analysis.?

The fields of computer vision and image processing are constantly evolving as new research and applications in these areas emerge. Staying abreast of the most up-to-date developments in this field is necessary in order to promote further research and apply these developments in real-world settings. Computer Vision: Concepts, Methodologies, Tools, and Applications is an innovative reference source for the latest academic material on development of computers for gaining understanding about videos and digital images. Highlighting a range of topics, such as computational models, machine learning, and image processing, this multi-volume book is ideally designed for academicians, technology professionals, students, and researchers interested in uncovering the latest innovations in the field.

This book gathers the proceedings of the 3rd International Conference on Advanced Intelligent Systems and Informatics 2017 (AIS2017), which took place in Cairo, Egypt from September 9 to 11, 2017. This international and interdisciplinary conference, which highlighted essential research and developments in the field of informatics and intelligent systems, was organized by the Scientific Research Group in Egypt (SRGE). The book's content is divided into five main sections: Intelligent Language Processing, Intelligent Systems, Intelligent Robotics Systems, Informatics, and the Internet of Things.

This book provides insights into the research in the fields of artificial intelligence in combination with Internet of Things (IoT) technologies. Today, the integration of artificial intelligence and IoT technologies is attracting considerable interest from both researchers and developers from academic fields and industries around the globe. It is foreseeable that the next generation of IoT research will focus on artificial intelligence/beyond artificial intelligence approaches. The rapidly growing numbers of artificial intelligence algorithms and big data solutions have significantly increased the number of potential applications for IoT technologies, but they have also created new challenges for the artificial intelligence community. This book shares the latest scientific advances in this area.

supporting the Conference.

Deep learning algorithms have brought a revolution to the computer vision community by introducing non-traditional and efficient

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solutions to several image-related problems that had long remained unsolved or partially addressed. This book presents a collection of eleven chapters where each individual chapter explains the deep learning principles of a specific topic, introduces reviews of up-to-date techniques, and presents research findings to the computer vision community. The book covers a broad scope of topics in deep learning concepts and applications such as accelerating the convolutional neural network inference on field-programmable gate arrays, fire detection in surveillance applications, face recognition, action and activity recognition, semantic segmentation for autonomous driving, aerial imagery registration, robot vision, tumor detection, and skin lesion segmentation as well as skin melanoma classification. The content of this book has been organized such that each chapter can be read independently from the others. The book is a valuable companion for researchers, for postgraduate and possibly senior undergraduate students who are taking an advanced course in related topics, and for those who are interested in deep learning with applications in computer vision, image processing, and pattern recognition.

Computer Vision Metrics provides an extensive survey and analysis of over 100 current and historical feature description and machine vision methods, with a detailed taxonomy for local, regional and global features. This book provides necessary background to develop intuition about why interest point detectors and feature descriptors actually work, how they are designed, with observations about tuning the methods for achieving robustness and invariance targets for specific applications. The survey is broader than it is deep, with over 540 references provided to dig deeper. The taxonomy includes search methods, spectra components, descriptor representation, shape, distance functions, accuracy, efficiency, robustness and invariance attributes, and more. Rather than providing 'how-to' source code examples and shortcuts, this book provides a counterpoint discussion to the many fine opencv community source code resources available for hands-on practitioners.

This book presents a thorough and detailed guide to image registration, outlining the principles and reviewing state-of-the-art tools and methods. The book begins by identifying the components of a general image registration system, and then describes the design of each component using various image analysis tools. The text reviews a vast array of tools and methods, not only describing the principles behind each tool and method, but also measuring and comparing their performances using synthetic and real data. Features: discusses similarity/dissimilarity measures, point detectors, feature extraction/selection and homogeneous/heterogeneous descriptors; examines robust estimators, point pattern matching algorithms, transformation functions, and image resampling and blending; covers principal axes methods, hierarchical methods, optimization-based methods, edge-based methods, model-based methods, and adaptive methods; includes a glossary, an extensive list of references, and an appendix on PCA.

The four-volume set comprising LNCS volumes 5302/5303/5304/5305 constitutes the refereed proceedings of the 10th European Conference on Computer Vision, ECCV 2008, held in Marseille, France, in October 2008. The 243 revised papers presented were carefully reviewed and selected from a total of 871 papers submitted. The four books cover the entire range of current issues in computer vision. The papers are organized in topical sections on recognition, stereo, people and face recognition, object tracking,

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matching, learning and features, MRFs, segmentation, computational photography and active reconstruction.

More than 30 leading experts from around the world provide comprehensive coverage of various branches of face image analysis, making this text a valuable asset for students, researchers, and practitioners engaged in the study, research, and development of face image analysis techniques.

The three-volume set, consisting of LNCS 9008, 9009, and 9010, contains carefully reviewed and selected papers presented at 15 workshops held in conjunction with the 12th Asian Conference on Computer Vision, ACCV 2014, in Singapore, in November 2014. The 153 full papers presented were selected from numerous submissions. LNCS 9008 contains the papers selected for the Workshop on Human Gait and Action Analysis in the Wild, the Second International Workshop on Big Data in 3D Computer Vision, the Workshop on Deep Learning on Visual Data, the Workshop on Scene Understanding for Autonomous Systems and the Workshop on Robust Local Descriptors for Computer Vision. LNCS 9009 contains the papers selected for the Workshop on Emerging Topics on Image Restoration and Enhancement, the First International Workshop on Robust Reading, the Second Workshop on User-Centred Computer Vision, the International Workshop on Video Segmentation in Computer Vision, the Workshop: My Car Has Eyes: Intelligent Vehicle with Vision Technology, the Third Workshop on E-Heritage and the Workshop on Computer Vision for Affective Computing. LNCS 9010 contains the papers selected for the Workshop on Feature and Similarity for Computer Vision, the Third International Workshop on Intelligent Mobile and Egocentric Vision and the Workshop on Human Identification for Surveillance.

Mapping and localization are two essential tasks in autonomous mobile robotics. Due to the unavoidable noise that sensors present, mapping algorithms usually rely on loop closure detection techniques, which entail the correct identification of previously seen places to reduce the uncertainty of the resulting maps. This book deals with the problem of generating topological maps of the environment using efficient appearance-based loop closure detection techniques. Since the quality of a visual loop closure detection algorithm is related to the image description method and its ability to index previously seen images, several methods for loop closure detection adopting different approaches are developed and assessed. Then, these methods are used in three novel topological mapping algorithms. The results obtained indicate that the solutions proposed attain a better performance than several state-of-the-art approaches. To conclude, given that loop closure detection is also a key component in other research areas, a multi-threaded image mosaicing algorithm is proposed. This approach makes use of one of the loop closure detection techniques previously introduced in order to find overlapping pairs between images and finally obtain seamless mosaics of different environments in a reasonable amount of time.

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

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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.

This book presents cutting-edge research on various ways to bridge the semantic gap in image and video analysis. The respective chapters address different stages of image processing, revealing that the first step is a feature extraction, the second is a segmentation process, the third is object recognition, and the fourth and last involve the semantic interpretation of the image. The semantic gap is a challenging area of research, and describes the difference between low-level features extracted from the image and the high-level semantic meanings that people can derive from the image. The result greatly depends on lower level vision techniques, such as feature selection, segmentation, object recognition, and so on. The use of deep models has freed humans from manually selecting and extracting the set of features. Deep learning does this automatically, developing more abstract features at the successive levels. The book offers a valuable resource for researchers, practitioners, students and professors in Computer Engineering, Computer Science and related fields whose work involves images, video analysis, image interpretation and so on.

Bachelor Thesis from the year 2014 in the subject Electrotechnology, grade: 1,0, Technical University of Munich (Media Technology), language: English, abstract: Content-based image retrieval (CBIR) for location recognition allows more precise indoor navigation than state-of-the-art methods. Using range images and matching a query image to a dataset of geo-tagged images is current research. This thesis investigates the prospects of applying 3D Shape feature detectors and descriptors to a point cloud projection of the range image. Therefor at first the keypoint detection methods Normal Aligned Radial Feature (NARF), Intrinsic Shape Signatures (ISS) and HARRIS3D detector are described, followed by the shape feature descriptors Spin Images, Signatures of Histograms of Orientations (SHOT) and Unique Shape Context (USC). Special attention is paid to the parameters. Varying radii, border estimation methods, preset filters and computing times are analysed in order to determine, how to set those parameters to obtain good results. The results exhibit the shortcomings of the state-of-the-art 3D feature algorithms, in application

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of indoor navigation. Finally suggestions for improvement are made.

Updated for OpenCV 4 and Python 3, this book covers the latest on depth cameras, 3D tracking, augmented reality, and deep neural networks, helping you solve real-world computer vision problems with practical code

Key Features Build powerful computer vision applications in concise code with OpenCV 4 and Python 3 Learn the fundamental concepts of image processing, object classification, and 2D and 3D tracking Train, use, and understand machine learning models such as Support Vector Machines (SVMs) and neural networks

Book Description Computer vision is a rapidly evolving science, encompassing diverse applications and techniques. This book will not only help those who are getting started with computer vision but also experts in the domain. You'll be able to put theory into practice by building apps with OpenCV 4 and Python 3. You'll start by understanding OpenCV 4 and how to set it up with Python 3 on various platforms. Next, you'll learn how to perform basic operations such as reading, writing, manipulating, and displaying still images, videos, and camera feeds. From taking you through image processing, video analysis, and depth estimation and segmentation, to helping you gain practice by building a GUI app, this book ensures you'll have opportunities for hands-on activities. Next, you'll tackle two popular challenges: face detection and face recognition. You'll also learn about object classification and machine learning concepts, which will enable you to create and use object detectors and classifiers, and even track objects in movies or video camera feed. Later, you'll develop your skills in 3D tracking and augmented reality. Finally, you'll cover ANNs and DNNs, learning how to develop apps for recognizing handwritten digits and classifying a person's gender and age. By the end of this book, you'll have the skills you need to execute real-world computer vision projects.

What you will learn Install and familiarize yourself with OpenCV 4's Python 3 bindings Understand image processing and video analysis basics Use a depth camera to distinguish foreground and background regions Detect and identify objects, and track their motion in videos Train and use your own models to match images and classify objects Detect and recognize faces, and classify their gender and age Build an augmented reality application to track an image in 3D Work with machine learning models, including SVMs, artificial neural networks (ANNs), and deep neural networks (DNNs)

Who this book is for If you are interested in learning computer vision, machine learning, and OpenCV in the context of practical real-world applications, then this book is for you. This OpenCV book will also be useful for anyone getting started with computer vision as well as experts who want to stay up-to-date with OpenCV 4 and Python 3. Although no prior knowledge of image processing, computer vision or machine learning is required, familiarity with basic Python programming is a must.

The visual recognition problem is central to computer vision research. From robotics to information retrieval, many desired applications demand the ability to identify and localize categories, places, and objects. This tutorial overviews computer vision algorithms for visual object recognition and image classification. We introduce primary representations and learning approaches, with an emphasis on recent advances in the field. The target audience consists of researchers or students working in AI, robotics, or vision who would like to understand what methods and representations are available for these problems. This lecture summarizes what is and isn't possible to do reliably today, and overviews key concepts that could be employed in systems

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requiring visual categorization.

The two-volume set LNCS 7324/7325 constitutes the refereed proceedings of the 9th International Conference on Image and Recognition, ICIAR 2012, held in Aveiro, Portugal, in June 2012. The 107 revised full papers presented were carefully reviewed and selected from 207 submissions. The papers are organized in topical sections on clustering and classification; image processing; image analysis; motion analysis and tracking; shape representation; 3D imaging; applications; biometrics and face recognition; human activity recognition; biomedical image analysis; retinal image analysis; and call detection and modeling.

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.

It is with great pleasure that we welcome you all to the proceedings of the 2nd

International Symposium on Visual Computing (ISVC2006) held in Lake Tahoe. Following a successful meeting last year, we witnessed a much stronger and more productive event this year. ISVC offers a common umbrella for the four main areas of visual computing including vision, graphics, visualization, and virtual reality. Its goal is to provide a forum for researchers, scientists, engineers and practitioners throughout the world to present their latest research findings, ideas, developments and applications in the broader area of visual computing. This year, the program consisted of 13 oral sessions, one poster session, ten special tracks, and six keynote presentations. The response to the call for papers was very strong. We received more than twice the papers received last year. Specifically, we received over 280 submissions for the main symposium from which we accepted 65 papers for oral presentation (23% acceptance) and 56 papers for poster presentation (20% acceptance). Special track papers were solicited separately through the Organizing and Program Committees of each track. A total of 57 papers were accepted for presentation in the special tracks. All papers were reviewed with an emphasis on potential to contribute to the state of the art in the field. Selection criteria included accuracy and originality of ideas, clarity and significance of results, and presentation quality. The review process was quite rigorous, involving two to three independent blind reviews followed by several days of discussion. During the discussion period we tried to correct anomalies and errors that might have existed in the initial reviews.

This book provides readers with a selection of high-quality chapters that cover both theoretical concepts and practical applications of image feature detectors and descriptors. It serves as reference for researchers and practitioners by featuring survey chapters and research contributions on image feature detectors and descriptors. Additionally, it emphasizes several keywords in both theoretical and practical aspects of image feature extraction. The keywords include acceleration of feature detection and extraction, hardware implantations, image segmentation, evolutionary algorithm, ordinal measures, as well as visual speech

recognition.

The three-volume set LNCS 9913, LNCS 9914, and LNCS 9915 comprises the refereed proceedings of the Workshops that took place in conjunction with the 14th European Conference on Computer Vision, ECCV 2016, held in Amsterdam, The Netherlands, in October 2016. The three-volume set LNCS 9913, LNCS 9914, and LNCS 9915 comprises the refereed proceedings of the Workshops that took place in conjunction with the 14th European Conference on Computer Vision, ECCV 2016, held in Amsterdam, The Netherlands, in October 2016. 27 workshops from 44 workshops proposals were selected for inclusion in the proceedings. These address the following themes: Datasets and Performance Analysis in Early Vision; Visual Analysis of Sketches; Biological and Artificial Vision; Brave New Ideas for Motion Representations; Joint ImageNet and MS COCO Visual Recognition Challenge; Geometry Meets Deep Learning; Action and Anticipation for Visual Learning; Computer Vision for Road Scene Understanding and Autonomous Driving; Challenge on Automatic Personality Analysis; BioImage Computing; Benchmarking Multi-Target Tracking: MOTChallenge; Assistive Computer Vision and Robotics; Transferring and Adapting Source Knowledge in Computer Vision; Recovering 6D Object Pose; Robust Reading; 3D Face Alignment in the Wild and Challenge; Egocentric Perception, Interaction and Computing; Local Features: State of the Art, Open Problems and Performance Evaluation; Crowd Understanding; Video Segmentation; The Visual Object Tracking Challenge Workshop; Web-scale Vision and Social Media; Computer Vision for Audio-visual Media; Computer Vision for ART Analysis; Virtual/Augmented Reality for Visual Artificial Intelligence; Joint Workshop on Storytelling with Images and Videos and Large Scale Movie Description and Understanding Challenge.

The two volumes LNCS 8814 and 8815 constitute the thoroughly refereed proceedings of the 11th International Conference on Image Analysis and Recognition, ICIAR 2014, held in Vilamoura, Portugal, in October 2014. The 107 revised full papers presented were carefully reviewed and selected from 177 submissions. The papers are organized in the following topical sections: image representation and models; sparse representation; image restoration and enhancement; feature detection and image segmentation; classification and learning methods; document image analysis; image and video retrieval; remote sensing; applications; action, gestures and audio-visual recognition; biometrics; medical image processing and analysis; medical image segmentation; computer-aided diagnosis; retinal image analysis; 3D imaging; motion analysis and tracking; and robot vision. This book introduces a range of image color feature extraction techniques. Readers are encouraged to try implementing the techniques discussed here on their own, all of which are presented in a very simple and step-by-step manner. In addition, the book can be used as an introduction to image color feature techniques for those who are new to the research field and software. The techniques are very easy to understand as most of them are described with pictorial examples. Not only the techniques themselves, but also their applications are covered. Accordingly, the book offers a valuable guide to these tools, which are a vital component of content-based image retrieval (CBIR).

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Explore the mathematical computations and algorithms for image processing using popular Python tools and frameworks. Key Features Practical coverage of every image processing task with popular Python libraries Includes topics such as pseudo-coloring, noise smoothing, computing image descriptors Covers popular machine learning and deep learning techniques for complex image processing tasks Book Description Image processing plays an important role in our daily lives with various applications such as in social media (face detection), medical imaging (X-ray, CT-scan), security (fingerprint recognition) to robotics & space. This book will touch the core of image processing, from concepts to code using Python. The book will start from the classical image processing techniques and explore the evolution of image processing algorithms up to the recent advances in image processing or computer vision with deep learning. We will learn how to use image processing libraries such as PIL, scikit-mage, and scipy ndimage in Python. This book will enable us to write code snippets in Python 3 and quickly implement complex image processing algorithms such as image enhancement, filtering, segmentation, object detection, and classification. We will be able to use machine learning models using the scikit-learn library and later explore deep CNN, such as VGG-19 with Keras, and we will also use an end-to-end deep learning model called YOLO for object detection. We will also cover a few advanced problems, such as image inpainting, gradient blending, variational denoising, seam carving, quilting, and morphing. By the end of this book, we will have learned to implement various algorithms for efficient image processing. What you will learn Perform basic data pre-processing tasks such as image denoising and spatial filtering in Python Implement Fast Fourier Transform (FFT) and Frequency domain filters (e.g., Weiner) in Python Do morphological image processing and segment images with different algorithms Learn techniques to extract features from images and match images Write Python code to implement supervised / unsupervised machine learning algorithms for image processing Use deep learning models for image classification, segmentation, object detection and style transfer Who this book is for This book is for Computer Vision Engineers, and machine learning developers who are good with Python programming and want to explore details and complexities of image processing. No prior knowledge of the image processing techniques is expected.

This book constitutes the thoroughly refereed post-workshop proceedings of the International Workshop on Medical Computer Vision, MCV 2010, held in Beijing, China, in September 2010 as a satellite event of the 13th International Conference on Medical Image Computing and Computer Assisted Intervention, MICCAI 2010. The 10 revised full papers and 11 revised poster papers presented were carefully reviewed and selected from 38 initial submissions. The papers explore the use of modern image recognition technology in tasks such as semantic anatomy parsing, automatic segmentation and quantification, anomaly detection and categorization, data harvesting, semantic navigation and visualization, data organization and clustering, and general-purpose automatic understanding of medical images.

This book provides an overview of the current state of research on development and application of methods, algorithms, tools and systems associated with the studies on man-machine interaction. Modern machines and computer systems are designed not only to process information, but also to work in dynamic environment, supporting or even replacing human activities in areas such as

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business, industry, medicine or military. The interdisciplinary field of research on man-machine interactions focuses on broad range of aspects related to the ways in which human make or use computational artifacts, systems and infrastructure. This monograph is the fourth edition in the series and presents new concepts concerning analysis, design and evaluation of man-machine systems. The selection of high-quality, original papers covers a wide scope of research topics focused on the main problems and challenges encountered within rapidly evolving new forms of human-machine relationships. The presented material is structured into following sections: human-computer interfaces, robot, control, embedded and navigation systems, bio-data analysis and mining, biomedical signal processing, image and motion data processing, decision support and expert systems, pattern recognition, fuzzy systems, algorithms and optimisation, computer networks and mobile technologies, and data management systems.

This book collects a series of research papers in the area of Image Processing and Communications which not only introduce a summary of current technology but also give an outlook of potential future problems in this area. The key objective of the book is to provide a collection of comprehensive references on some recent theoretical development as well as novel applications in image processing and communications. The book is divided into two parts and presents the proceedings of the 6th International Image Processing and Communications Conference (IP&C 2014) held in Bydgoszcz, 10-12 September 2014. Part I deals with image processing. A comprehensive survey of different methods of image processing, computer vision is also presented. Part II deals with the telecommunications networks and computer networks. Applications in these areas are considered.

Local Invariant Features Detectors is an overview of invariant interest point detectors, how they evolved over time, how they work, and what their respective strengths and weaknesses are.

This book constitutes the thoroughly refereed proceedings of the 12th International Conference on Image Analysis and Recognition, ICIAR 2015, held in Niagara Falls, ON, Canada, in July 2015. The 55 revised full papers and 5 short papers presented were carefully reviewed and selected from 80 submissions. The papers are organized in the following topical sections: image quality assessment; image enhancement; image segmentation, registration and analysis; image coding, compression and encryption; dimensionality reduction and classification; biometrics; face description, detection and recognition; human activity recognition; robotics and 3D vision; medical image analysis; and applications.

Video is one of the most important forms of multimedia available, as it is utilized for security purposes, to transmit information, promote safety, and provide entertainment. As motion is the most integral element in videos, it is important that motion detection systems and algorithms meet specific requirements to achieve accurate detection of real time events. Feature Detectors and Motion Detection in Video Processing explores innovative methods and approaches to analyzing and retrieving video images. Featuring empirical research and significant frameworks regarding feature detectors and descriptor algorithms, the book is a critical reference source for professionals, researchers, advanced-level students, technology developers, and academicians.

The two volume set LNCS 9256 and 9257 constitutes the refereed proceedings of the 16th International Conference on Computer Analysis of Images and Patterns, CAIP 2015, held in Valletta, Malta, in September 2015. The 138 papers presented were carefully reviewed and

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selected from numerous submissions. CAIP 2015 is the sixteenth in the CAIP series of biennial international conferences devoted to all aspects of computer vision, image analysis and processing, pattern recognition, and related fields.

The focus of this book is an application of Digital Twin as a concept and an approach, based on the most accurate view on a physical production system and its digital representation of complex engineering products and systems. It describes a methodology to create and use Digital Twin in a built environment for the improvement and optimization of factory processes such as factory planning, investment planning, bottleneck analysis, and in-house material transport. The book provides a practical response based on achievements of engineering informatics in solving challenges related to the optimization of factory layout and corresponding processes. This book introduces the topic, providing a foundation of knowledge on process planning, before discussing the acquisition of objects in a factory and the methods for object recognition. It presents process simulation techniques, explores challenges in process planning, and concludes by looking at future areas of progression. By providing a holistic, trans-disciplinary perspective, this book will showcase Digital Twin technology as state-of-the-art both in research and practice.

This book addresses the problems that hinder image authentication in the presence of noise. It considers the advantages and disadvantages of existing algorithms for image authentication and shows new approaches and solutions for robust image authentication. The state of the art algorithms are compared and, furthermore, innovative approaches and algorithms are introduced. The introduced algorithms are applied to improve image authentication, watermarking and biometry. Aside from presenting new directions and algorithms for robust image authentication in the presence of noise, as well as image correction, this book also: Provides an overview of the state of the art algorithms for image authentication in the presence of noise and modifications, as well as a comparison of these algorithms, Presents novel algorithms for robust image authentication, whereby the image is tried to be corrected and authenticated, Examines different views for the solution of problems connected to image authentication in the presence of noise, Shows examples, how the new techniques can be applied to image authentication, watermarking and biometry. This book is written on the one hand for students, who want to learn about image processing, authentication, watermarking and biometry, and on the other hand for engineers and researchers, who work on aspects of robustness against modifications of secure images.

The 2010 edition of the European Conference on Computer Vision was held in Heraklion, Crete. The call for papers attracted an absolute record of 1,174 submissions. We describe here the selection of the accepted papers: Thirty-eight area chairs were selected coming from Europe (18), USA and Canada (16), and Asia (4). Their selection was based on the following criteria: (1) Researchers who had served at least two times as Area Chairs within the past two years at major vision conferences were excluded; (2) Researchers who served as Area Chairs at the 2010 Computer Vision and Pattern Recognition were also excluded (exception: ECCV 2012 Program Chairs); (3) Minimization of overlap introduced by Area Chairs being former student and advisors; (4) 20% of the Area Chairs had never served before in a major conference; (5) The Area Chair selection process made all possible efforts to achieve a reasonable geographic distribution between countries, thematic areas and trends in computer vision. Each Area Chair was assigned by the Program Chairs between 28–32 papers. Based on paper content, the Area Chair recommended up to seven potential reviewers per paper. Such assignment was made using all reviewers in the database including the conflicting ones. The Program Chairs manually entered the missing conflict domains of approximately 300 reviewers. Based on the recommendation of the Area Chairs, three reviewers were selected per paper (with at least one being of the top three suggestions), with 99.

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