Object Detection And Recognition In Digital Images Theory And Practice

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Deep Learning in Computer Vision MDPI
Welcome to the proceedings of the 8th European Conference on Computer - sion! Following a very successful ECCV 2002, the response to our call for papers was almost equally strong – 555 papers were submitted. We accepted 41 papers for oral and 149 papers for poster presentation. Several innovations were introduced into the review process. First, the n- ber of program committee members was increased to reduce their review load. We managed to assign to program committee members no more than 12 papers. Second, we adopted a paper ranking system. Program committee members were asked to rank all the papers assigned to them, even those that were reviewed by additional reviewers. Third, we allowed authors to respond to the reviews consolidated in a discussion involving the area chair and the reviewers. Fourth, thereports,thereviews,andtheresponsesweremadeavailabletotheauthorsas well as to the program committee members. Our aim was to provide the authors with maximal feedback and to let the program committee members know how authors reacted to their reviews and how their reviews were or were not re?ected in the ?nal decision. Finally, we reduced the length of reviewed papers from 15 to 12 pages. ThepreparationofECCV2004wentsmoothlythankstothee?ortsofthe- ganizing committee, the area chairs, the program committee, and the reviewers. We are indebted to Anders Heyden, Mads Nielsen, and Henrik J. Nielsen for passing on ECCV traditions and to Dominique Asselineau from ENST/TSI who kindly provided his GestRFIA conference software. We thank Jan-Olof Eklundh and Andrew Zisserman for encouraging us to organize ECCV 2004 in Prague.
Large Scale Image Classification and Object Detection John Wiley & Sons
Deep learning algorithms have brought a revolution to the computer vision community by introducing non-traditional and efficient 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.
Handbook of Object Novelty Recognition Springer Science & Business Media
Computer and Information Science
Evolutionary Synthesis of Pattern Recognition Systems Apress

Much research as of late has focused on biologically inspired vision models that are based on our understanding of how the visual cortex processes information. One prominent example of such a system is HMAX [17]. HMAX attempts to simulate the biological process for object recognition in cortex based on the model proposed by Hubel & Wiesel [10]. This thesis investigates the ability of an HMAX-like system (GLIMPSE [20]) to perform object-detection in cluttered natural scenes. I evaluate these results using the StreetScenes database from MIT [1, 8]. This thesis addresses three questions: (1) Can the GLIMPSE-based object detection system replicate the results on object-detection reported by Bileschi using HMAX? (2) Which features computed by GLIMPSE lead to the best object-detection performance? (3) What effect does elimination of clutter in the training sets have on the performance of our system? As part of this thesis, I built an object detection and recognition system using GLIMPSE [20] and demonstrate that it approximately replicates the results reported in Bileschi's thesis. In addition, I found that extracting and combining features from GLIMPSE using different layers of the HMAX model gives the best overall invariance to position, scale and translation for recognition tasks, but comes with a much higher computational overhead. Further contributions include the creation of modified training and test sets based on the StreetScenes database, with removed clutter in the training data and extending the annotations for the detection task to cover more objects of interest that were not in the original annotations of the database.

Computer Vision -- ECCV 2010 Springer

Deep Learning in Object Recognition, Detection, and Segmentation provides a comprehensive introductory overview of a topic that is having major impact on many areas of research in signal processing, computer vision, and machine learning.

Machine Learning for Computer Vision Deep Learning in Object Detection and Recognition

Build practical applications of computer vision using the OpenCV library with Python. This book discusses different facets of computer vision such as image and object detection, tracking and motion analysis and their applications with examples. The author starts with an introduction to computer vision followed by setting up OpenCV from scratch using Python. The next section discusses specialized image processing and segmentation and how images are stored and processed by a computer. This involves pattern recognition and image tagging using the OpenCV library. Next, you'll work with object detection, video storage and interpretation, and human detection using OpenCV. Tracking and motion is also discussed in detail. The book also discusses creating complex deep learning models with CNN and RNN. The author finally concludes with recent applications and trends in computer vision. After reading this book, you will be able to understand and implement computer vision and its applications with OpenCV using Python. You will also be able to create deep learning models with CNN and RNN and understand how these cutting-edge deep learning architectures work. What You Will Learn Understand what computer vision is, and its overall application in intelligent automation systems Discover the deep learning techniques required to build computer vision applications Build complex computer vision applications using the latest techniques in OpenCV, Python, and NumPy Create practical applications and implementations such as face detection and recognition, handwriting recognition, object detection, and tracking and motion analysis Who This Book Is ForThose who have a basic understanding of machine learning and Python and are looking to learn computer vision and its applications.

Computer Vision -- ACCV 2007 Springer Science & Business Media

This book discusses recent advances in object detection and recognition using deep learning methods, which have achieved great success in the field of computer vision and image processing. It provides a systematic and methodical overview of the latest developments in deep learning theory and its applications to computer vision, illustrating them using key topics, including object detection, face analysis, 3D object recognition, and image retrieval. The book offers a rich blend of theory and practice. It is suitable for students, researchers and practitioners interested in deep learning, computer vision and beyond and can also be used as a reference book. The comprehensive comparison of various deep-learning applications helps readers with a basic understanding of machine learning and calculus grasp the theories and inspires applications in other computer vision tasks.

2020 6th International Conference on Control, Automation and Robotics (ICCAR) Springer

Object Detection and Recognition using Computer Vision has been a very interesting and a challenging field of study from past three decades. Recent advancements in Deep Learning and as well as increase in computational power has reignited the interest of researchers in this field in last decade. Implementing Machine Learning and Computer Vision techniques in scene classification and object localization particularly for automated driving purpose has been a topic of discussion in last half decade and we have seen some brilliant advancements in recent times as self-driving cars are becoming a reality. In this thesis we focus on Region based Convolutional Neural Networks (R-CNN) for object recognition and localizing for enabling Automated Driving Assistance Systems (ADAS). R-CNN combines two ideas: (1) one can apply high-capacity Convolutional Networks (CNN) to bottom-up region proposals in order to localize and segment objects and (2) when labelling data is scarce, supervised pre-training for an auxiliary task, followed by domain-specific-finetuning, boosts performance significantly. In this thesis, inspired by the RCNN framework we describe an object detection and segmentation system that uses a multilayer convolutional network which computes highly discriminative, yet invariant features to classify image regions and outputs those regions as detected bounding boxes for specifically a driving scenario to detect objects which are generally on road such as traffic signs, cars, pedestrians etc. We also discuss different types of region based convolutional networks such as RCNN, Fast RCNN and Faster RCNN, describe their architecture and perform a time study to determine which of them leads to real-time object detection for a driving scenario when implemented on a regular PC architecture. Further we discuss how we can use such R-CNN for determining the distance of objects on road such as Cars, Traffic Signs, Pedestrians from a sensor (camera) mounted on the vehicle which shows how Computer Vision and Machine Learning techniques are useful in automated braking systems (ABS) and in perception algorithms such as Simultaneous Localization and Mapping (SLAM).

Advanced Computational Intelligence for Object Detection, Feature Extraction and Recognition in Smart Sensor Environments World Scientific

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 requiring visual categorization.

Object Detection and Recognition in Digital Images Springer

"This course teaches effective object recognition and its implementation with the powerful OpenCV libraries. You will learn how to enhance your OpenCV skills with deep learning. You will explore and master OpenCV for Object Recognition/Classification. The course explains all the necessary theory and concepts of computer vision, image processing, and machine learning. You also learn the practical application of OpenCV libraries. Its capabilities and functionality are shown along with a tutorial on how to set up a machine such that it's able to use OpenCV in codes. You will start by seeing how to work with images in OpenCV, enhancement and filtering in OpenCV. You will then move on to building an application which is capable of object recognition and performing homography. You will then move on to object classification and recognizing text in an image. In the end, you will be able to use object recognition algorithm which will be used by you for practical application."--Resource description page.

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

This volume is a post-event proceedings volume and contains selected papers based on presentations given, and vivid discussions held, during two workshops held in Taormina in 2003 and 2004. The 30 thoroughly revised papers presented are organized in the following topical sections: recognition of specific objects, recognition of object categories, recognition of object categories with geometric relations, and joint recognition and segmentation.

Shape Based Object Detection and Recognition in Silhouettes and Real Images Springer

The recent emergence of Local Binary Patterns (LBP) has led to significant progress in applying texture methods to various computer vision problems and applications. The focus of this research has broadened from 2D textures to 3D textures and spatiotemporal (dynamic) textures. Also, where texture was once utilized for applications such as remote sensing, industrial inspection and biomedical image analysis, the introduction of LBP-based approaches have provided outstanding results in problems relating to face and activity analysis, with future scope for face and facial expression recognition, biometrics, visual surveillance and video analysis. Computer Vision Using Local Binary Patterns provides a detailed description of the LBP methods and their variants both in spatial and spatiotemporal domains. This comprehensive reference also provides an excellent overview as to how texture methods can be utilized for solving different kinds of computer vision and image analysis problems. Source codes of the basic LBP algorithms, demonstrations, some databases and a comprehensive LBP bibliography can be found from an accompanying web site. Topics include: local binary patterns and their variants in spatial and spatiotemporal domains, texture classification and segmentation, description of interest regions, applications in image retrieval and 3D recognition - Recognition and segmentation of dynamic textures, background subtraction, recognition of actions, face analysis using still images and image sequences, visual speech recognition and LBP in various applications. Written by pioneers of LBP, this book is an essential resource for researchers, professional engineers and graduate students in computer vision, image analysis and pattern recognition. The book will also be of interest to all those who work with specific applications of machine vision.

2D Object Detection and Recognition Springer Science & Business Media

The seven-volume set comprising LNCS volumes 8689-8695 constitutes the refereed proceedings of the 13th European Conference on Computer Vision, ECCV 2014, held in Zurich, Switzerland, in September 2014. The 363 revised papers presented were carefully reviewed and selected from 1444 submissions. The papers are organized in topical sections on tracking and activity recognition; recognition; learning and inference; structure from motion and feature matching; computational photography and low-level vision; vision; segmentation and saliency; context and 3D scenes; motion and 3D scene analysis; and poster sessions.

Development of a Vision-based Object Detection and Recognition System for Intelligent Vehicle

Machine Learning Mastery

Step-by-step tutorials on deep learning neural networks for computer vision in python with Keras.

Principles and Applications CRC Press

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 phtometory, motion and tracking, human detection, and segmentation.

Computer Vision Using Local Binary Patterns Springer

Recent years have seen a vast development in various methodologies for object detection and feature extraction and recognition, both in theory and in practice. When processing images, videos, or other types of multimedia, one needs efficient solutions to perform fast and reliable processing. Computational intelligence is used for medical screening where the detection of disease symptoms is carried out, in prevention monitoring to detect suspicious behavior, in agriculture systems to help with growing plants and animal breeding, in transportation systems for the control of incoming and outgoing transportation, for unmanned vehicles to detect obstacles and avoid collisions, in optics and materials for the detection of surface damage, etc. In many cases, we use developed techniques which help us to recognize some special features. In the context of this innovative research on computational intelligence, the Special Issue “Advanced Computational Intelligence for Object Detection, Feature Extraction and Recognition in Smart Sensor Environments” present an excellent opportunity for the dissemination of recent results and achievements for further innovations and development. It is my pleasure to present this collection of excellent contributions to the research community. - Prof. Marcin Woźniak, Silesian University of Technology, Poland –

Image Classification, Object Detection, and Face Recognition in Python CRC Press

Handbook of Object Novelty Recognition, Volume 26, synthesizes the empirical and theoretical advances in the field of object recognition and memory that have occurred since the development of the spontaneous object recognition task. The book is divided into four sections, covering vision and perception of object features and attributions, definitions of concepts that are associated with object recognition, the influence of brain lesions and drugs on various memory functions and processes, and models of neuropsychiatric disorders based on spontaneous object recognition tasks. A final section covers genetic and developmental studies and gender and hormone studies. Details the brain structures and the neural circuits that underlie memory of objects, including vision and olfaction Provides a thorough description of the object novelty recognition task, variations on the basic task, and methods and techniques to help researchers avoid common

pitfalls Assists researchers in understanding all aspects of object memory, conducting object novelty recognition tests, and producing reliable, reproducible results

For Facial Recognition, Object Detection, and Pattern Recognition Using Python Packt Publishing Ltd

Containing twenty six contributions by experts from all over the world, this book presents both research and review material describing the evolution and recent developments of various pattern recognition methodologies, ranging from statistical, linguistic, fuzzy-set-theoretic, neural, evolutionary computing and rough-set-theoretic to hybrid soft computing, with significant real-life applications. Pattern Recognition and Big Data provides state-of-the-art classical and modern approaches to pattern recognition and mining, with extensive real life applications. The book describes efficient soft and robust machine learning algorithms and granular computing techniques for data mining and knowledge discovery; and the issues associated with handling Big Data. Application domains considered include bioinformatics, cognitive machines (or machine mind developments), biometrics, computer vision, the e-nose, remote sensing and social network analysis.

Learn Computer Vision Using OpenCV Apress

Significant advancement of research on image classification and object detection has been achieved in the past decade. Deep convolutional neural networks have exhibited superior performance in many visual recognition tasks including image classification, object detection, and scene labeling, due to their large learning capacity and resistance to overfit. However, learning a robust deep CNN model for object recognition is still quite challenging because image classification and object detection is a severely unbalanced large-scale problem. In this dissertation, we aim at improving the performance of image classification and object detection algorithms by taking advantage of deep convolutional neural networks by utilizing the following strategies: We introduce Deep Neural Pattern, a local feature densely extracted from an image with arbitrary resolution using a well trained deep convolutional neural network. We propose a latent CNN framework, which will automatically select the most discriminate region in the image to reduce the effect of irrelevant regions. We also develop a new combination scheme for multiple CNNs via Latent Model Ensemble to overcome the local minima problem of CNNs. In addition, a weakly supervised CNN framework, referred to as Multiple Instance Learning Convolutional Neural Networks is developed to alleviate strict label requirements. Finally, a novel residual-network architecture, Residual networks of Residual networks, is constructed to improve the optimization ability of very deep convolutional neural networks. All the proposed algorithms are validated by thorough experiments and have shown solid accuracy on large scale object detection and recognition benchmarks.

Moving Object Detection and Recognition Using Local Ternary Pattern in Surveillance Video Springer Nature

Gain insights into image-processing methodologies and algorithms, using machine learning and neural networks in Python. This book begins with the environment setup, understanding basic image-processing terminology, and exploring Python concepts that will be useful for implementing the algorithms discussed in the book. You will then cover all the core image processing algorithms in detail before moving onto the biggest computer vision library: OpenCV. You'll see the OpenCV algorithms and how to use them for image processing. The next section looks at advanced machine learning and deep learning methods for image processing and classification. You'll work with concepts such as pulse coupled neural networks, AdaBoost, XG boost, and convolutional neural networks for image-specific applications. Later you'll explore how models are made in real time and then deployed using various DevOps tools. All the concepts in Practical Machine Learning and Image Processing are explained using real-life scenarios. After reading this book you will be able to apply image processing techniques and make machine learning models for customized application. What You Will Learn Discover image-processing algorithms and their applications using Python Explore image processing using the OpenCV library Use TensorFlow, scikit-learn, NumPy, and other libraries Work with machine learning and deep learning algorithms for image processing Apply image-processing techniques to five real-time projects Who This Book Is For Data scientists and software developers interested in image processing and computer vision.

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