Video Image Segmentation And Object Detection Using Mrf Model A Spatio Temporal Segmentation Scheme For Moving Object Detection

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Computer Vision and Internet of Things - Lavanya Sharma 2022-05-20
Computer Vision and Internet of Things: Technologies and Applications explores the utilization of Internet of Things (IoT) with computer vision and its underlying technologies in different applications areas. Using a series of present and future applications – including business insights, indoor-outdoor securities, smart grids, human detection and tracking, intelligent traffic monitoring, e-health departments, and medical imaging – this book focuses on providing a detailed description of the utilization of IoT with computer vision and its underlying technologies in critical application areas, such as smart grids, emergency departments, intelligent traffic cams, insurance, and the automotive industry. Key Features • Covers the challenging issues related to sensors, detection, and tracking of moving objects with solutions to handle relevant challenges • Describes the latest technological advances in IoT and computer vision with their implementations • Combines image processing and analysis into a unified framework to understand both IOT and computer vision applications • Explores mining and tracking of motion-based object data, such as trajectory prediction and prediction of a particular location of object data, and their critical applications • Provides novel solutions for medical imaging (skin lesion detection, cancer detection, enhancement techniques for MRI images, and automated disease prediction) This book is primarily aimed at graduates and researchers working in the areas of IoT, computer vision, big data, cloud computing, and remote sensing. It is also an ideal resource for IT professionals and technology developers.

Deep Learning in Object Recognition, Detection, and Segmentation - Xiaogang Wang 2016-07-14
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.

Computer Vision Projects with PyTorch - Akshay Kulkarni 2022-07-19
Design and develop end-to-end, production-grade computer vision projects for real-world industry problems. This book discusses computer vision algorithms and their

applications using PyTorch. The book begins with the fundamentals of computer vision: convolutional neural nets, RESNET, YOLO, data augmentation, and other regularization techniques used in the industry. And then it gives you a quick overview of the PyTorch libraries used in the book. After that, it takes you through the implementation of image classification problems, object detection techniques, and transfer learning while training and running inference. The book covers image segmentation and an anomaly detection model. And it discusses the fundamentals of video processing for computer vision tasks putting images into videos. The book concludes with an explanation of the complete model building process for deep learning frameworks using optimized techniques with highlights on model AI explainability. After reading this book, you will be able to build your own computer vision projects using transfer learning and PyTorch. What You Will Learn Solve problems in computer vision with PyTorch. Implement transfer learning and perform image classification, object detection, image segmentation, and other computer vision applications Design and develop production-grade computer vision projects for real-world industry problems Interpret computer vision models and solve business problems Who This Book Is For Data scientists and machine learning engineers interested in building computer vision projects and solving business problems

Computer Vision, Pattern Recognition, Image Processing, and Graphics - Renu Rameshan 2018-04-25

This book constitutes the refereed proceedings of the 6th National Conference on Computer Vision, Pattern Recognition, Image Processing, and Graphics, NCVPRIPG 2017, held in Mandi, India, in December 2017. The 48 revised full papers presented in this volume were carefully reviewed and selected from 147 submissions. The papers are organized in topical sections on video processing; image and signal processing; segmentation, retrieval, captioning; pattern recognition applications.

Practical Machine Learning for Computer Vision - Valliappa Lakshmanan 2021-07-21

This practical book shows you how to employ machine learning models to extract information from images. ML engineers and data scientists will learn how to solve a variety of image problems including classification, object detection, autoencoders, image generation, counting, and captioning with proven ML techniques. This book provides a great introduction to end-to-end deep learning: dataset creation, data preprocessing, model design, model training, evaluation, deployment, and interpretability. Google engineers Valliappa Lakshmanan, Martin Görner, and Ryan Gillard show you how to develop accurate and explainable computer vision ML models and put them into large-scale production using robust ML architecture in a flexible and maintainable way. You'll learn how to design, train, evaluate, and predict with models written in TensorFlow or Keras. You'll learn how to: Design ML architecture for computer vision tasks Select a model (such as ResNet, SqueezeNet, or EfficientNet) appropriate to your task Create an end-to-end ML pipeline to train, evaluate, deploy, and explain your model Preprocess images for data augmentation and to support learnability Incorporate explainability and responsible AI best practices Deploy image models as web services or on edge devices Monitor and manage ML models

Deep Learning for Computer Vision - Rajalingappaa Shanmugamani 2018-01-23

Learn how to model and train advanced neural networks to implement a variety of Computer Vision tasks Key Features Train different kinds of deep learning model from scratch to solve specific problems in Computer Vision Combine the power of Python, Keras, and TensorFlow to build deep learning models for object detection, image classification, similarity learning, image captioning, and more Includes tips on optimizing and improving the performance of your models under various constraints Book Description Deep learning has shown its power in several application areas of Artificial Intelligence, especially in Computer Vision. Computer Vision is the science of understanding and manipulating images, and finds enormous applications in the areas of robotics, automation, and so on. This book will also show you, with practical examples, how to develop Computer Vision applications by leveraging the power of deep learning. In this book, you will learn

different techniques related to object classification, object detection, image segmentation, captioning, image generation, face analysis, and more. You will also explore their applications using popular Python libraries such as TensorFlow and Keras. This book will help you master state-of-the-art, deep learning algorithms and their implementation. What you will learn Set up an environment for deep learning with Python, TensorFlow, and Keras Define and train a model for image and video classification Use features from a pre-trained Convolutional Neural Network model for image retrieval Understand and implement object detection using the real-world Pedestrian Detection scenario Learn about various problems in image captioning and how to overcome them by training images and text together Implement similarity matching and train a model for face recognition Understand the concept of generative models and use them for image generation Deploy your deep learning models and optimize them for high performance Who this book is for This book is targeted at data scientists and Computer Vision practitioners who wish to apply the concepts of Deep Learning to overcome any problem related to Computer Vision. A basic knowledge of programming in Python—and some understanding of machine learning concepts—is required to get the best out of this book.

Feature Detectors and Motion Detection in Video Processing - Dey, Nilanjan 2016-10-25

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.

A Comprehensive Review of Modern Object Segmentation Approaches: Introduction 2. Traditional Methods in Image Segmentation 3. Deep Models for Semantic Segmentation 4. Deep Models for Instance Segmentation 5. Deep Learning Models for 3D and Video Segmentation 6. Deep Learning Models for Panoptic Segmentation 7. Datasets 8. Evaluation Metrics 9. Challenges and Future Directions 10. Conclusion Acknowledgements References - Yuanbo Wang 2022

Automated visual recognition tasks such as image classification, image captioning, object detection and image segmentation are essential for image and video processing. Of these, image segmentation is the task of associating pixels in an image with their respective object class labels. It has a wide range of applications within many industries, including healthcare, transportation, robotics, fashion, home improvement, and tourism.In this monograph, both traditional and modern object segmentation approaches are investigated, comparing their strengths, weaknesses, and utilities. The main focus is on the deep learning-based techniques for the two most widely solved segmentation tasks: Semantic Segmentation and Instance Segmentation. A wide range of deep learning-based segmentation techniques developed in recent years are examined. Various themes emerge from these techniques that push machines to their limits, and often deviate from human perception principles. In addition, an overview of the widely used benchmark datasets for each of these techniques, along with the respective evaluation metrics to measure the models' performances, are presented. Potential future research directions conclude the monograph.This monograph serves as a good introduction to the automated visual recognition task of image segmentation and is intended for students and professionals.

Advances in Signal Processing and Communication - Banmali S. Rawat 2018-11-19

This book is a collection of selected peer-reviewed papers presented at the International Conference on Signal Processing and Communication (ICSC 2018). It covers current research and developments in the fields of communications, signal processing, VLSI circuits and systems, and embedded systems. The book

offers in-depth discussions and analyses of latest problems across different sub-fields of signal processing and communications. The contents of this book will prove to be useful for students, researchers, and professionals working in electronics and electrical engineering, as well as other allied fields.

Towards Smart World - Lavanya Sharma 2020-12-13

Towards Smart World: Homes to Cities Using Internet of Things provides an overview of basic concepts from the rising of machines and communication to IoT for making cities smart, real-time applications domains, related technologies, and their possible solutions for handling relevant challenges. This book highlights the utilization of IoT for making cities smart and its underlying technologies in real-time application areas such as emergency departments, intelligent traffic systems, indoor and outdoor securities, automotive industries, environmental monitoring, business entrepreneurship, facial recognition, and motion-based object detection. Features The book covers the challenging issues related to sensors, detection, and tracking of moving objects, and solutions to handle relevant challenges. It contains the most recent research analysis in the domain of communications, signal processing, and computing sciences for facilitating smart homes, buildings, environmental conditions, and cities. It presents the readers with practical approaches and future direction for using IoT in smart cities and discusses how it deals with human dynamics, the ecosystem, and social objects and their relation. It describes the latest technological advances in IoT and visual surveillance with their implementations. This book is an ideal resource for IT professionals, researchers, undergraduate or postgraduate students, practitioners, and technology developers who are interested in gaining deeper knowledge and implementing IoT for smart cities, real-time applications areas, and technologies, and a possible set of solutions to handle relevant challenges. Dr. Lavanya Sharma is an Assistant Professor in the Amity Institute of Information Technology at Amity University UP, Noida, India. She has been a recipient of several prestigious awards during her academic career. She is an active nationally recognized researcher who has published numerous papers in her field.

Video Segmentation and Its Applications - King Ngi Ngan 2011-05-10

Video segmentation has become one of the core areas in visual signal processing research. The objective of Video Segmentation and Its Applications is to present the latest advances in video segmentation and analysis techniques while covering the theoretical approaches, real applications and methods being developed in the computer vision and video analysis community. The book will also provide researchers and practitioners a comprehensive understanding of state-of-the-art of video segmentation techniques and a resource for potential applications and successful practice.

Computer Vision with SAS - Susan Kahler 2020-07-22

Computer vision is a field of artificial intelligence that trains computers to interpret and understand the visual world. In recent years, computer vision has begun to rival and even surpass human visual abilities in many areas. SAS offers many different solutions to train computers to "see" by identifying and classifying objects, and several groundbreaking papers have been written to demonstrate these techniques. The papers included in this special collection demonstrate how the latest computer vision tools and techniques can be used to solve a variety of business problems.

Advances in Image and Video Segmentation - Zhang, Yu-Jin 2006-05-31

"This book attempts to bring together a selection of the latest results of state-of-the art research in image and video segmentation, one of the most critical tasks of image and video analysis that has the objective of extracting information (represented by data) from an image or a sequence of images (video)"--Provided by publisher.

Image Sequence Analysis - T. S. Huang 2013-11-11

The processing of image sequences has a broad spectrum of important applica tions including target tracking, robot navigation, bandwidth compression of TV conferencing video signals, studying the motion of biological cells using microcinematography, cloud tracking, and highway traffic monitoring. Image sequence processing involves a large amount of data.

However, because of the progress in computer, LSI, and VLSI technologies, we have now reached a stage when many useful processing tasks can be done in a reasonable amount of time. As a result, research and development activities in image sequence analysis have recently been growing at a rapid pace. An IEEE Computer Society Workshop on Computer Analysis of Time-Varying Imagery was held in Philadelphia, April 5-6, 1979. A related special issue of the IEEE Transactions on Pattern Anal ysis and Machine Intelligence was published in November 1980. The IEEE Com puter magazine has also published a special issue on the subject in 1981. The purpose of this book is to survey the field of image sequence analysis and to discuss in depth a number of important selected topics. The seven chap ters fall into two categories. Chapters 2, 3, and 7 are comprehensive surveys on, respectively, the whole field of image sequence analysis, efficient coding of image sequences, and the processing of medical image sequences. In Chapters 1, 4, 5, and 6 the authors present mainly results of their own research on, respectively, motion estimation, noise reduction in image sequences, moving object extraction, and occlusion.

Computer Vision – ECCV 2012 - Andrew Fitzgibbon 2012-09-26

The seven-volume set comprising LNCS volumes 7572-7578 constitutes the refereed proceedings of the 12th European Conference on Computer Vision, ECCV 2012, held in Florence, Italy, in October 2012. The 408 revised papers presented were carefully reviewed and selected from 1437 submissions. The papers are organized in topical sections on geometry, 2D and 3D shapes, 3D reconstruction, visual recognition and classification, visual features and image matching, visual monitoring: action and activities, models, optimisation, learning, visual tracking and image registration, photometry: lighting and colour, and image segmentation.

Mastering Computer Vision with TensorFlow 2.x - Krishnendu Kar 2020-05-15

Apply neural network architectures to build state-of-the-art computer vision applications using the Python programming language Key FeaturesGain a fundamental understanding of advanced computer vision and neural network models in use todayCover tasks such as low-level vision, image classification, and object detectionDevelop deep learning models on cloud platforms and optimize them using TensorFlow Lite and the OpenVINO toolkitBook Description Computer vision allows machines to gain human-level understanding to visualize, process, and analyze images and videos. This book focuses on using TensorFlow to help you learn advanced computer vision tasks such as image acquisition, processing, and analysis. You'll start with the key principles of computer vision and deep learning to build a solid foundation, before covering neural network architectures and understanding how they work rather than using them as a black box. Next, you'll explore architectures such as VGG, ResNet, Inception, R-CNN, SSD, YOLO, and MobileNet. As you advance, you'll learn to use visual search methods using transfer learning. You'll also cover advanced computer vision concepts such as semantic segmentation, image inpainting with GAN's, object tracking, video segmentation, and action recognition. Later, the book focuses on how machine learning and deep learning concepts can be used to perform tasks such as edge detection and face recognition. You'll then discover how to develop powerful neural network models on your PC and on various cloud platforms. Finally, you'll learn to perform model optimization methods to deploy models on edge devices for real-time inference. By the end of this book, you'll have a solid understanding of computer vision and be able to confidently develop models to automate tasks. What you will learnExplore methods of feature extraction and image retrieval and visualize different layers of the neural network modelUse TensorFlow for various visual search methods for real-world scenariosBuild neural networks or adjust parameters to optimize the performance of modelsUnderstand TensorFlow DeepLab to perform semantic segmentation on images and DCGAN for image inpaintingEvaluate your model and optimize and integrate it into your application to operate at scaleGet up to speed with techniques for performing manual and automated image annotationWho this book is for This book is for computer vision professionals, image processing professionals, machine learning engineers and AI developers who have some knowledge of machine learning and deep

learning and want to build expert-level computer vision applications. In addition to familiarity with TensorFlow, Python knowledge will be required to get started with this book.

Recent Advances in Information and Communication Technology 2020 - Phayung Meesad 2020-03-21

This book gathers the proceedings of the 16th International Conference on Computing and Information Technology (IC2IT 2020), held on May 14th–15th, 2020, at Dusit Thani Pattaya, Thailand. The topics covered include big data, artificial intelligence, machine learning, natural language processing, speech recognition, image and video processing, and deep learning. In turn, the topics represent major research and engineering directions for autonomous driving, language assistants, automatic translation, and answering systems. Lastly, they are responses to major economic changes around the world, which are increasingly shaped by the need for enhanced globalization and worldwide cooperation, and by emerging global problems.

Computer Vision, Graphics, and Image Processing - Snehasis Mukherjee 2017-10-19

This book constitutes the refereed conference proceedings of the ICVGIP 2016 Satellite Workshops, WCVA, DAR, and MedImage, held in Guwahati, India, in December 2016. The papers presented are extended versions of the papers of three of the four workshops: Computer Vision Applications, Document Analysis and Recognition and Medical Image Processing. The Computer Vision Application track received 52 submissions and after a rigorous review process, 18 papers were presented. The focus is mainly on industrial applications of computer vision and related technologies. The Document Analysis and Recognition track received 10 submissions from which 7 papers were selected. The MedImage workshops focuses on problems in medical image computing and received 14 papers from which 9 were accepted for presentation in this book.

Bridging the Semantic Gap in Image and Video Analysis - Halina Kwaśnicka 2018-02-20

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 future 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.

Computational Modelling of Objects Represented in Images III - Paolo Di Giamberardino 2012-08-24

Computational Modelling of Objects Represented in Images: Fundamentals, Methods and Applications III contains all contributions presented at the International Symposium CompIMAGE 2012 - Computational Modelling of Object Presented in Images: Fundamentals, Methods and Applications (Rome, Italy, 5-7 September 2012). The contributions cover the state-o

Computer Vision and Image Processing - Neeta Nain 2020-03-28

This two-volume set (CCIS 1147, CCIS 1148) constitutes the refereed proceedings of the 4th International Conference on Computer Vision and Image Processing. held in Jaipur, India, in September 2019. The 73 full papers and 10 short papers were carefully reviewed and selected from 202 submissions. The papers are organized according to the following topics: Part I: Biometrics; Computer Forensic; Computer Vision; Dimension Reduction; Healthcare Information Systems; Image Processing; Image segmentation; Information Retrieval; Instance based learning; Machine Learning.Part II: Neural Network; Object Detection; Object Recognition; Online Handwriting Recognition; Optical Character Recognition; Security and

Privacy; Unsupervised Clustering.

Object Detection by Stereo Vision Images - R. Arokia Priya 2022-09-14

OBJECT DETECTION BY STEREO VISION IMAGES Since both theoretical and practical aspects of the developments in this field of research are explored, including recent state-of-the-art technologies and research opportunities in the area of object detection, this book will act as a good reference for practitioners, students, and researchers. Current state-of-the-art technologies have opened up new opportunities in research in the areas of object detection and recognition of digital images and videos, robotics, neural networks, machine learning, stereo vision matching algorithms, soft computing, customer prediction, social media analysis, recommendation systems, and stereo vision. This book has been designed to provide directions for those interested in researching and developing intelligent applications to detect an object and estimate depth. In addition to focusing on the performance of the system using high-performance computing techniques, a technical overview of certain tools, languages, libraries, frameworks, and APIs for developing applications is also given. More specifically, detection using stereo vision images/video from its developmental stage up till today, its possible applications, and general research problems relating to it are covered. Also presented are techniques and algorithms that satisfy the peculiar needs of stereo vision images along with emerging research opportunities through analysis of modern techniques being applied to intelligent systems. Audience Researchers in information technology looking at robotics, deep learning, machine learning, big data analytics, neural networks, pattern & data mining, and image and object recognition. Industrial sectors include automotive electronics, security and surveillance systems, and online retailers.

Image Processing Using FPGAs - Donald Bailey 2019-06-11

This book presents a selection of papers representing current research on using field programmable gate arrays (FPGAs) for realising image processing algorithms. These papers are reprints of papers selected for a Special Issue of the Journal of Imaging on image processing using FPGAs. A diverse range of topics is covered, including parallel soft processors, memory management, image filters, segmentation, clustering, image analysis, and image compression. Applications include traffic sign recognition for autonomous driving, cell detection for histopathology, and video compression. Collectively, they represent the current state-of-the-art on image processing using FPGAs.

Artificial Intelligence, Machine Learning, and Data Science Technologies - Neeraj Mohan 2021-10-12

This book provides a comprehensive, conceptual, and detailed overview of the wide range of applications of Artificial Intelligence, Machine Learning, and Data Science and how these technologies have an impact on various domains such as healthcare, business, industry, security, and how all countries around the world are feeling this impact. The book aims at low-cost solutions which could be implemented even in developing countries. It highlights the significant impact these technologies have on various industries and on us as humans. It provides a virtual picture of forthcoming better human life shadowed by the new technologies and their applications and discusses the impact Data Science has on business applications. The book will also include an overview of the different AI applications and their correlation between each other. The audience is graduate and postgraduate students, researchers, academicians, institutions, and professionals who are interested in exploring key technologies like Artificial Intelligence, Machine Learning, and Data Science.

Practical Machine Learning and Image Processing - Himanshu Singh 2019-02-26

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 LearnDiscover 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.

Pattern Recognition and Machine Intelligence - Sergei O. Kuznetsov 2011-06-25
This book constitutes the refereed proceedings of the 4th International Conference on Pattern Recognition and Machine Intelligence, PReMI 2011, held in Moscow, Russia in June/July 2011. The 65 revised papers presented together with 5 invited talks were carefully reviewed and selected from 140 submissions. The papers are organized in topical sections on pattern recognition and machine learning; image analysis; image and video information retrieval; natural language processing and text and data mining; watermarking, steganography and biometrics; soft computing and applications; clustering and network analysis; bio and chemo analysis; and document image processing.

Advances in Image and Video Technology - Domingo Mery 2007-12-07
This book constitutes the refereed proceedings of the Second Pacific Rim Symposium on Image and Video Technology, PSIVT 2007, held in Santiago, Chile, in December 2007. The 75 revised full papers presented together with four keynote lectures were carefully reviewed and selected from 155 submissions. The symposium features ongoing research including all aspects of video and multimedia, both technical and artistic perspectives and both theoretical and practical issues.

Practical Image and Video Processing Using MATLAB - Oge Marques 2011-08-04
UP-TO-DATE, TECHNICALLY ACCURATE COVERAGE OF ESSENTIAL TOPICS IN IMAGE AND VIDEO PROCESSING This is the first book to combine image and video processing with a practical MATLAB®-oriented approach in order to demonstrate the most important image and video techniques and algorithms. Utilizing minimal math, the contents are presented in a clear, objective manner, emphasizing and encouraging experimentation. The book has been organized into two parts. Part I: Image Processing begins with an overview of the field, then introduces the fundamental concepts, notation, and terminology associated with image representation and basic image processing operations. Next, it discusses MATLAB® and its Image Processing Toolbox with the start of a series of chapters with hands-on activities and step-by-step tutorials. These chapters cover image acquisition and digitization; arithmetic, logic, and geometric operations; point-based, histogram-based, and neighborhood-based image enhancement techniques; the Fourier Transform and relevant frequency-domain image filtering techniques; image restoration; mathematical morphology; edge detection techniques; image segmentation; image compression and coding; and feature extraction and representation. Part II: Video Processing presents the main concepts and terminology associated with analog video signals and systems, as well as digital video formats and standards. It then describes the technically involved problem of standards conversion, discusses motion estimation and compensation techniques, shows how video sequences can be filtered, and concludes with an example of a solution to object detection and tracking in video sequences using MATLAB®. Extra features of this book include: More than 30 MATLAB® tutorials, which consist of step-by-step guides toexploring image and video processing techniques using MATLAB® Chapters supported by figures, examples, illustrative problems, and exercises Useful websites and an extensive list of bibliographical references This accessible text is ideal for upper-level undergraduate and

graduate students in digital image and video processing courses, as well as for engineers, researchers, software developers, practitioners, and anyone who wishes to learn about these increasingly popular topics on their own.

Topics in Medical Image Processing and Computational Vision - Joao Manuel R.S. Tavares 2015-04-05

The sixteen chapters included in this book were written by invited experts of international recognition and address important issues in Medical Image Processing and Computational Vision, including: Object Recognition, Object Detection, Object Tracking, Pose Estimation, Facial Expression Recognition, Image Retrieval, Data Mining, Automatic Video Understanding and Management, Edges Detection, Image Segmentation, Modelling and Simulation, Medical thermography, Database Systems, Synthetic Aperture Radar and Satellite Imagery. Different applications are addressed and described throughout the book, comprising: Object Recognition and Tracking, Facial Expression Recognition, Image Database, Plant Disease Classification, Video Understanding and Management, Image Processing, Image Segmentation, Bio-structure Modelling and Simulation, Medical Imaging, Image Classification, Medical Diagnosis, Urban Areas Classification, Land Map Generation. The book brings together the current state-of-the-art in the various multi-disciplinary solutions for Medical Image Processing and Computational Vision, including research, techniques, applications and new trends contributing to the development of the related areas.

Developments in Medical Image Processing and Computational Vision - João Manuel Tavares 2015-04-20

This book presents novel and advanced topics in Medical Image Processing and Computational Vision in order to solidify knowledge in the related fields and define their key stakeholders. It contains extended versions of selected papers presented in VipIMAGE 2013 – IV International ECCOMAS Thematic Conference on Computational Vision and Medical Image, which took place in Funchal, Madeira, Portugal, 14-16 October 2013. The twenty-two chapters were written by invited experts of international recognition and address important issues in medical image processing and computational vision, including: 3D vision, 3D visualization, colour quantisation, continuum mechanics, data fusion, data mining, face recognition, GPU parallelisation, image acquisition and reconstruction, image and video analysis, image clustering, image registration, image restoring, image segmentation, machine learning, modelling and simulation, object detection, object recognition, object tracking, optical flow, pattern recognition, pose estimation, and texture analysis. Different applications are addressed and described throughout the book, comprising: biomechanical studies, bio-structure modelling and simulation, bone characterization, cell tracking, computer-aided diagnosis, dental imaging, face recognition, hand gestures detection and recognition, human motion analysis, human-computer interaction, image and video understanding, image processing, image segmentation, object and scene reconstruction, object recognition and tracking, remote robot control, and surgery planning. This volume is of use to researchers, students, practitioners and manufacturers from several multidisciplinary fields, such as artificial intelligence, bioengineering, biology, biomechanics, computational mechanics, computational vision, computer graphics, computer science, computer vision, human motion, imagiology, machine learning, machine vision, mathematics, medical image, medicine, pattern recognition, and physics.

Image Segmentation - Tao Lei 2022-09-26

Image Segmentation Summarizes and improves new theory, methods, and applications of current image segmentation approaches, written by leaders in the field The process of image segmentation divides an image into different regions based on the characteristics of pixels, resulting in a simplified image that can be more efficiently analyzed. Image segmentation has wide applications in numerous fields ranging from industry detection and bio-medicine to intelligent transportation and architecture. Image Segmentation: Principles, Techniques, and Applications is an up-to-date collection of recent techniques and methods devoted to the field of computer vision. Covering fundamental concepts, new theories and approaches, and a variety of practical applications including

medical imaging, remote sensing, fuzzy clustering, and watershed transform. In-depth chapters present innovative methods developed by the authors—such as convolutional neural networks, graph convolutional networks, deformable convolution, and model compression—to assist graduate students and researchers apply and improve image segmentation in their work. Describes basic principles of image segmentation and related mathematical methods such as clustering, neural networks, and mathematical morphology. Introduces new methods for achieving rapid and accurate image segmentation based on classic image processing and machine learning theory. Presents techniques for improved convolutional neural networks for scene segmentation, object recognition, and change detection, etc. Highlights the effect of image segmentation in various application scenarios such as traffic image analysis, medical image analysis, remote sensing applications, and material analysis, etc. Image Segmentation: Principles, Techniques, and Applications is an essential resource for undergraduate and graduate courses such as image and video processing, computer vision, and digital signal processing, as well as researchers working in computer vision and image analysis looking to improve their techniques and methods.

Social Data Analytics - Amin Beheshti 2022-08-01

This book is an introduction to social data analytics along with its challenges and opportunities in the age of Big Data and Artificial Intelligence. It focuses primarily on concepts, techniques and methods for organizing, curating, processing, analyzing, and visualizing big social data: from text to image and video analytics. It provides novel techniques in storytelling with social data to facilitate the knowledge and fact discovery. The book covers a large body of knowledge that will help practitioners and researchers in understanding the underlying concepts, problems, methods, tools and techniques involved in modern social data analytics. It also provides real-world applications of social data analytics, including: Sales and Marketing, Influence Maximization, Situational Awareness, customer success and Segmentation, and performance analysis of the industry. It provides a deep knowledge in social data analytics by comprehensively classifying the current state of research, by describing in-depth techniques and methods, and by highlighting future research directions. Lecturers will find a wealth of material to choose from for a variety of courses, ranging from undergraduate courses in data science to graduate courses in data analytics.

Deep Learning for Computer Vision - Jason Brownlee 2019-04-04

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

Advanced Image and Video Processing Using MATLAB - Shengrong Gong 2018-08-21

This book offers a comprehensive introduction to advanced methods for image and video analysis and processing. It covers deraining, dehazing, inpainting, fusion, watermarking and stitching. It describes techniques for face and lip recognition, facial expression recognition, lip reading in videos, moving object tracking, dynamic scene classification, among others. The book combines the latest machine learning methods with computer vision applications, covering topics such as event recognition based on deep learning,dynamic scene classification based on topic model, person re-identification based on metric learning and behavior analysis. It also offers a systematic introduction to image evaluation criteria showing how to use them in different experimental contexts. The book offers an example-based practical guide to researchers, professionals and graduate students dealing with advanced problems in image analysis and computer vision.

Strengthening Deep Neural Networks - Katy Warr 2019-07-03

As deep neural networks (DNNs) become increasingly common in real-world applications, the potential to deliberately "fool" them with data that wouldn’t trick a human presents a new attack vector. This practical book examines real-world scenarios where DNNs—the algorithms intrinsic to much of AI—are used daily to process image, audio, and video data. Author Katy Warr considers attack motivations, the risks posed by this adversarial input, and methods for increasing AI robustness to these attacks. If you’re a data scientist developing DNN

algorithms, a security architect interested in how to make AI systems more resilient to attack, or someone fascinated by the differences between artificial and biological perception, this book is for you. Delve into DNNs and discover how they could be tricked by adversarial input Investigate methods used to generate adversarial input capable of fooling DNNs Explore real-world scenarios and model the adversarial threat Evaluate neural network robustness; learn methods to increase resilience of AI systems to adversarial data Examine some ways in which AI might become better at mimicking human perception in years to come

Performance Evaluation Software - Bahadir Karasulu 2013-03-25

Performance Evaluation Software: Moving Object Detection and Tracking in Videos introduces a software approach for the real-time evaluation and performance comparison of the methods specializing in moving object detection and/or tracking (D&T) in video processing. Digital video content analysis is an important item for multimedia content-based indexing (MCBI), content-based video retrieval (CBVR) and visual surveillance systems. There are some frequently-used generic algorithms for video object D&T in the literature, such as Background Subtraction (BS), Continuously Adaptive Mean-shift (CMS), Optical Flow (OF), etc. An important problem for performance evaluation is the absence of any stable and flexible software for comparison of different algorithms. In this frame, we have designed and implemented the software for comparing and evaluating the well-known video object D&T algorithms on the same platform. This software is able to compare them with the same metrics in real-time and on the same platform. It also works as an automatic and/or semi-automatic test environment in real-time, which uses the image and video processing essentials, e.g. morphological operations and filters, and ground-truth (GT) XML data files, charting/plotting capabilities, etc. Along with the comprehensive literature survey of the abovementioned video object D&T algorithms, this book also covers the technical details of our performance benchmark software as well as a case study on people D&T for the functionality of the software.

Artificial Intelligence Applications and Innovations - Ilias Maglogiannis 2020-05-29

This 2 volume-set of IFIP AICT 583 and 584 constitutes the refereed proceedings of the 16th IFIP WG 12.5 International Conference on Artificial Intelligence Applications and Innovations, AIAI 2020, held in Neos Marmaras, Greece, in June 2020.* The 70 full papers and 5 short papers presented were carefully reviewed and selected from 149 submissions. They cover a broad range of topics related to technical, legal, and ethical aspects of artificial intelligence systems and their applications and are organized in the following sections: Part I: classification; clustering - unsupervised learning -analytics; image processing; learning algorithms; neural network modeling; object tracking - object detection systems; ontologies - AI; and sentiment analysis - recommender systems. Part II: AI ethics - law; AI constraints; deep learning - LSTM; fuzzy algebra - fuzzy systems; machine learning; medical - health systems; and natural language. *The conference was held virtually due to the COVID-19 pandemic.

Recent Trends in Image Processing and Pattern Recognition - K. C. Santosh 2021-02-25

This two-volume set constitutes the refereed proceedings of the Third International Conference on Recent Trends in Image Processing and Pattern Recognition (RTIP2R) 2020, held in Aurangabad, India, in January 2020. The 78 revised full papers presented were carefully reviewed and selected from 329 submissions. The papers are organized in topical sections in the two volumes. Part I: Computer vision and applications; Data science and machine learning; Document understanding and Recognition. Part II: Healthcare informatics and medical imaging; Image analysis and recognition; Signal processing and pattern recognition; Image and signal processing in Agriculture.

Background Modeling and Foreground Detection for Video Surveillance - Thierry Bouwmans 2014-07-25

Background modeling and foreground detection are important steps in video processing used to detect robustly moving objects in challenging environments. This requires effective methods for dealing with dynamic backgrounds and illumination changes as well as algorithms that must meet real-time and low memory

requirements. Incorporating both established and new ideas, Background Modeling and Foreground Detection for Video Surveillance provides a complete overview of the concepts, algorithms, and applications related to background modeling and foreground detection. Leaders in the field address a wide range of challenges, including camera jitter and background subtraction. The book presents the top methods and algorithms for detecting moving objects in video surveillance. It covers statistical models, clustering models, neural networks, and fuzzy models. It also addresses sensors, hardware, and implementation issues and discusses the resources and datasets required for evaluating and comparing background subtraction algorithms. The datasets and codes used in the text, along with links to software demonstrations, are available on the book's website. A one-stop resource on up-to-date models, algorithms, implementations, and benchmarking techniques, this book helps researchers and industry developers understand how to apply background models and foreground detection methods to video surveillance and related areas, such as optical motion capture, multimedia applications, teleconferencing, video editing, and human–computer interfaces. It can also be used in graduate courses on computer vision, image processing, real-time architecture, machine learning, or data mining.

Moving Object Detection and Segmentation for Remote Aerial Video Surveillance - Teutsch, Michael 2015-03-11