

ACCESS OPENCV COMPUTER VISION APPLICATION PROGRAMMING COOKBOOK 2ND EDITION RAW

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OpenCV Computer Vision Application Programming Cookbook 2nd Edition Raw Introduction

OpenCV Computer Vision Application Programming Cookbook

OpenCV 3 Computer Vision Application Programming Cookbook is appropriate for novice C++ programmers who want to learn how to use the OpenCV library to build computer vision applications. It is also suitable for professional software developers wishing to be introduced to the concepts of computer vision programming. It can also be used as a companion book in a university-level computer vision courses. It constitutes an excellent reference for graduate students and researchers in image processing and computer vision.

OpenCV 2

Over 50 recipes to help you build computer vision applications in C++ using the OpenCV library In Detail OpenCV Computer Vision Application Programming Cookbook Second Edition is your guide to the development of computer vision applications. The book shows you how to install and deploy the OpenCV library to write an effective computer vision application. Different techniques for image enhancement, pixel manipulation, and shape analysis will be presented. You will also learn how to process video from files or cameras and detect and track moving objects. You will also be introduced to recent approaches in machine learning and object classification. This book is a comprehensive reference guide that exposes you to practical and fundamental computer vision concepts, illustrated by extensive examples. What You Will Learn Install and create a program using the OpenCV library Process an image by manipulating its pixels Analyze an image using histograms Segment images into homogenous regions and extract meaningful objects Apply image filters to enhance image content Exploit image geometry in order to relate different views of a pictured scene Calibrate the camera from different image observations Detect faces and people in images using machine learning techniques Downloading the example code for this book. You can download the example code files for all Packt books you have purchased from your account at <http://www.PacktPub.com>. If you purchased this book elsewhere, you can visit <http://www.PacktPub.com/support> and register to have the files e-mailed directly to you.

OpenCV Computer Vision Application Programming Cookbook Second Edition

Recipes to help you build computer vision applications that make the most of the popular C++ library OpenCV 3 About This Book Written to the latest, gold-standard specification of OpenCV 3 Master OpenCV, the open source library of the computer vision community Master fundamental concepts in computer vision and image processing Learn about the important classes and functions of OpenCV with complete working examples applied to real images Who This Book Is For OpenCV 3 Computer Vision Application Programming Cookbook Third Edition is appropriate for novice C++ programmers who want to learn how to

use the OpenCV library to build computer vision applications. It is also suitable for professional software developers who wish to be introduced to the concepts of computer vision programming. It can also be used as a companion book for university-level computer vision courses. It constitutes an excellent reference for graduate students and researchers in image processing and computer vision. What You Will Learn Install and create a program using the OpenCV library Process an image by manipulating its pixels Analyze an image using histograms Segment images into homogenous regions and extract meaningful objects Apply image filters to enhance image content Exploit the image geometry in order to relay different views of a pictured scene Calibrate the camera from different image observations Detect people and objects in images using machine learning techniques Reconstruct a 3D scene from images In Detail Making your applications see has never been easier with OpenCV. With it, you can teach your robot how to follow your cat, write a program to correctly identify the members of One Direction, or even help you find the right colors for your redecoration. OpenCV 3 Computer Vision Application Programming Cookbook Third Edition provides a complete introduction to the OpenCV library and explains how to build your first computer vision program. You will be presented with a variety of computer vision algorithms and exposed to important concepts in image and video analysis that will enable you to build your own computer vision applications. This book helps you to get started with the library, and shows you how to install and deploy the OpenCV library to write effective computer vision applications following good programming practices. You will learn how to read and write images and manipulate their pixels. Different techniques for image enhancement and shape analysis will be presented. You will learn how to detect specific image features such as lines, circles or corners. You will be introduced to the concepts of mathematical morphology and image filtering. The most recent methods for image matching and object recognition are described, and you'll discover how to process video from files or cameras, as well as how to detect and track moving objects. Techniques to achieve camera calibration and perform multiple-view analysis will also be explained. Finally, you'll also get acquainted with recent approaches in machine learning and object classification. Style and approach This book will arm you with the basics you need to start writing world-aware applications right from a pixel level all the way through to processing video sequences.

OpenCV Computer Vision Application Programming Cookbook Second Edition

Discover interesting recipes to help you understand the concepts of object detection, image processing, and facial detection Key Features Explore the latest features and APIs in OpenCV 4 and build computer vision algorithms Develop effective, robust, and fail-safe vision for your applications Build computer vision algorithms with machine learning capabilities Book Description OpenCV is an image and video processing library used for all types of image and video analysis. Throughout the book, you'll work through recipes that implement a variety of tasks, such as facial recognition and detection. With 70 self-contained tutorials, this book examines common pain points and best practices for computer vision (CV) developers. Each recipe addresses a specific problem and offers a proven, best-practice solution with insights into how it works, so that you can copy the code and configuration files and modify them to suit your needs. This book begins by setting up OpenCV, and explains how to manipulate pixels. You'll understand how you can process images with classes and count pixels with histograms. You'll also learn detecting, describing, and matching interest points. As you advance through the chapters, you'll get to grips with estimating projective relations in images, reconstructing 3D scenes, processing video sequences, and tracking visual motion. In the final chapters, you'll cover deep learning concepts such as face and object detection. By the end of the book, you'll be able to confidently implement a range to computer vision algorithms to meet the technical requirements of your complex CV projects What you will learn Install and create a program using the OpenCV library Segment images into homogenous regions and extract meaningful objects Apply image filters to enhance image content Exploit image geometry to relay different views of a pictured scene Calibrate the camera from different image observations Detect people and objects in images using machine learning techniques Reconstruct a 3D scene from images Explore face detection using deep learning Who this book is for If you're a CV developer or professional who already uses or would like to use OpenCV for building computer vision software, this book is for you. You'll also find this book useful if you're a C++ programmer looking to extend your computer vision skillset by learning OpenCV.

OpenCV 3 Computer Vision Application Programming Cookbook

OpenCV 3 Computer Vision Application Programming Cookbook is appropriate for novice C++ programmers who want to learn how to use the OpenCV library to build computer vision applications. It is also suitable for professional software developers wishing to be introduced to the concepts of computer vision programming. It can also be used as a companion book in a university-level computer vision courses. It constitutes an excellent reference for graduate students and researchers in image processing and computer vision.

OpenCV 4 Computer Vision Application Programming Cookbook

Over 100 recipes to help you build computer vision applications that make the most of the popular C library OpenCV 3

About This Book*Written to the latest, gold-standard specification of OpenCV 3*Master OpenCV, the open source library of the computer vision community*Master fundamental concepts in computer vision and image processing*Learn about the important classes and functions of OpenCV with complete working examples applied to real images

Who This Book Is ForOpenCV 3 Computer Vision Application Programming Cookbook Third Edition is appropriate for novice C++ programmers who want to learn how to use the OpenCV library to build computer vision applications. It is also suitable for professional software developers who wish to be introduced to the concepts of computer vision programming. It can also be used as a companion book for university-level computer vision courses. It constitutes an excellent reference for graduate students and researchers in image processing and computer vision.

What You Will Learn*Install and create a program using the OpenCV library*Process an image by manipulating its pixels*Analyze an image using histograms*Segment images into homogenous regions and extract meaningful objects*Apply image filters to enhance image content*Exploit the image geometry in order to relay different views of a pictured scene*Calibrate the camera from different image observations*Detect faces and people in images using machine learning techniques

In DetailMaking your applications see has never been easier with OpenCV. With it, you can teach your robot how to follow your cat, write a program to correctly identify the members of One Direction, or even help you find the right colors for your redecoration.

OpenCV 3 Computer Vision Application Programming Cookbook Third Edition provides a complete introduction to the OpenCV library and explains how to build your first computer vision program. You will be presented with a variety of computer vision algorithms and exposed to important concepts in image and video analysis that will enable you to build your own computer vision applications. This book helps you to get started with the library, and shows you how to install and deploy the OpenCV library to write effective computer vision applications following good programming practices. You will learn how to read and write images and manipulate their pixels. Different techniques for image enhancement and shape analysis will be presented. You will learn how to detect specific image features such as lines, circles or corners. You will be introduced to the concepts of mathematical morphology and image filtering. The most recent methods for image matching and object recognition are described, and you'll discover how to process video from files or cameras, as well as how to detect and track moving objects. Techniques to achieve camera calibration and perform multiple-view analysis will also be explained. Finally, you'll also get acquainted with recent approaches in machine learning and object classification.

OpenCV Computer Vision Application Programming Cookbook

Discover interesting recipes to help you understand the concepts of object detection, image processing, and facial detection

Key Features Explore the latest features and APIs in OpenCV 4 and build computer vision algorithms Develop effective, robust, and fail-safe vision for your applications Build computer vision algorithms with machine learning capabilities

Book Description OpenCV is an image and video processing library used for all types of image and video analysis. Throughout the book, you'll work through recipes that implement a variety of tasks. With 70 self-contained tutorials, this book examines common pain points and best practices for computer vision (CV) developers. Each recipe addresses a specific problem and offers a proven, best-practice solution with insights into how it works, so that you can copy the code and

configuration files and modify them to suit your needs. This book begins by setting up OpenCV, and explains how to manipulate pixels. You'll understand how you can process images with classes and count pixels with histograms. You'll also learn detecting, describing, and matching interest points. As you advance through the chapters, you'll get to grips with estimating projective relations in images, reconstructing 3D scenes, processing video sequences, and tracking visual motion. In the final chapters, you'll cover deep learning concepts such as face and object detection. By the end of the book, you'll be able to confidently implement a range of computer vision algorithms to meet the technical requirements of your complex CV projects. What you will learn

- Install and create a program using the OpenCV library
- Segment images into homogenous regions and extract meaningful objects
- Apply image filters to enhance image content
- Exploit image geometry to relay different views of a pictured scene
- Calibrate the camera from different image observations
- Detect people and objects in images using machine learning techniques
- Reconstruct a 3D scene from images
- Explore face detection using deep learning

Who this book is for If you're a CV developer or professional who already uses or would like to use OpenCV for building computer vision software, this book is for you. You'll also find this book useful if you're a C++ programmer looking to extend your computer vision skillset by learning OpenCV. Downloading the example code for this ebook: You can download the example code files for this ebook on GitHub at the following link: [https://github ...](https://github.com)

OpenCV 3 Computer Vision Application Programming Cookbook - Third Edition

Get to grips with traditional computer vision algorithms and deep learning approaches, and build real-world applications with OpenCV and other machine learning frameworks

Key Features

- Understand how to capture high-quality image data, detect and track objects, and process the actions of animals or humans
- Implement your learning in different areas of computer vision
- Explore advanced concepts in OpenCV such as machine learning, artificial neural network, and augmented reality

Book Description OpenCV is a native cross-platform C++ library for computer vision, machine learning, and image processing. It is increasingly being adopted in Python for development. This book will get you hands-on with a wide range of intermediate to advanced projects using the latest version of the framework and language, OpenCV 4 and Python 3.8, instead of only covering the core concepts of OpenCV in theoretical lessons. This updated second edition will guide you through working on independent hands-on projects that focus on essential OpenCV concepts such as image processing, object detection, image manipulation, object tracking, and 3D scene reconstruction, in addition to statistical learning and neural networks. You'll begin with concepts such as image filters, Kinect depth sensor, and feature matching. As you advance, you'll not only get hands-on with reconstructing and visualizing a scene in 3D but also learn to track visually salient objects. The book will help you further build on your skills by demonstrating how to recognize traffic signs and emotions on faces. Later, you'll understand how to align images, and detect and track objects using neural networks. By the end of this OpenCV Python book, you'll have gained hands-on experience and become proficient at developing advanced computer vision apps according to specific business needs. What you will learn

- Generate real-time visual effects using filters and image manipulation techniques such as dodging and burning
- Recognize hand gestures in real-time and perform hand-shape analysis based on the output of a Microsoft Kinect sensor
- Learn feature extraction and feature matching to track arbitrary objects of interest
- Reconstruct a 3D real-world scene using 2D camera motion and camera reprojection techniques
- Detect faces using a cascade classifier and identify emotions in human faces using multilayer perceptrons
- Classify, localize, and detect objects with deep neural networks

Who this book is for This book is for intermediate-level OpenCV users who are looking to enhance their skills by developing advanced applications. Familiarity with OpenCV concepts and Python libraries, and basic knowledge of the Python programming language are assumed.

OpenCV 4 Computer Vision Application Programming Cookbook - Fourth Edition

A practical guide to understanding the core machine learning and deep learning algorithms, and implementing them to create intelligent image processing systems using OpenCV 4

Key Features

- Gain insights into machine learning algorithms, and implement them using OpenCV 4 and scikit-learn
- Get up to speed with Intel OpenVINO and its integration with OpenCV 4
- Implement high-performance machine

learning models with helpful tips and best practices

Book Description OpenCV is an opensource library for building computer vision apps. The latest release, OpenCV 4, offers a plethora of features and platform improvements that are covered comprehensively in this up-to-date second edition. You'll start by understanding the new features and setting up OpenCV 4 to build your computer vision applications. You will explore the fundamentals of machine learning and even learn to design different algorithms that can be used for image processing. Gradually, the book will take you through supervised and unsupervised machine learning. You will gain hands-on experience using scikit-learn in Python for a variety of machine learning applications. Later chapters will focus on different machine learning algorithms, such as a decision tree, support vector machines (SVM), and Bayesian learning, and how they can be used for object detection computer vision operations. You will then delve into deep learning and ensemble learning, and discover their real-world applications, such as handwritten digit classification and gesture recognition. Finally, you'll get to grips with the latest Intel OpenVINO for building an image processing system. By the end of this book, you will have developed the skills you need to use machine learning for building intelligent computer vision applications with OpenCV 4.

What you will learn

- Understand the core machine learning concepts for image processing
- Explore the theory behind machine learning and deep learning algorithm design
- Discover effective techniques to train your deep learning models
- Evaluate machine learning models to improve the performance of your models
- Integrate algorithms such as support vector machines and Bayes classifier in your computer vision applications
- Use OpenVINO with OpenCV 4 to speed up model inference

Who this book is for This book is for Computer Vision professionals, machine learning developers, or anyone who wants to learn machine learning algorithms and implement them using OpenCV 4. If you want to build real-world Computer Vision and image processing applications powered by machine learning, then this book is for you. Working knowledge of Python programming is required to get the most out of this book.

OpenCV 4 with Python Blueprints

Explains the theory behind basic computer vision and provides a bridge from the theory to practical implementation using the industry standard OpenCV libraries

Computer Vision is a rapidly expanding area and it is becoming progressively easier for developers to make use of this field due to the ready availability of high quality libraries (such as OpenCV2). This text is intended to facilitate the practical use of computer vision with the goal being to bridge the gap between the theory and the practical implementation of computer vision. The book will explain how to use the relevant OpenCV library routines and will be accompanied by a full working program including the code snippets from the text. This textbook is a heavily illustrated, practical introduction to an exciting field, the applications of which are becoming almost ubiquitous. We are now surrounded by cameras, for example cameras on computers & tablets/ cameras built into our mobile phones/ cameras in games consoles; cameras imaging difficult modalities (such as ultrasound, X-ray, MRI) in hospitals, and surveillance cameras. This book is concerned with helping the next generation of computer developers to make use of all these images in order to develop systems which are more intuitive and interact with us in more intelligent ways.

Explains the theory behind basic computer vision and provides a bridge from the theory to practical implementation using the industry standard OpenCV libraries

Offers an introduction to computer vision, with enough theory to make clear how the various algorithms work but with an emphasis on practical programming issues

Provides enough material for a one semester course in computer vision at senior undergraduate and Masters levels

Includes the basics of cameras and images and image processing to remove noise, before moving on to topics such as image histogramming; binary imaging; video processing to detect and model moving objects; geometric operations & camera models; edge detection; features detection; recognition in images

Contains a large number of vision application problems to provide students with the opportunity to solve real problems. Images or videos for these problems are provided in the resources associated with this book which include an enhanced eBook

Machine Learning for OpenCV 4

Turn futuristic ideas about computer vision and machine learning into demonstrations that are both functional and entertaining

Key Features Build OpenCV 4 apps with Python 2 and 3 on desktops and Raspberry Pi, Java

on Android, and C# in Unity Detect, classify, recognize, and measure real-world objects in real-time Work with images from diverse sources, including the web, research datasets, and various cameras Book Description OpenCV 4 is a collection of image processing functions and computer vision algorithms. It is open source, supports many programming languages and platforms, and is fast enough for many real-time applications. With this handy library, you'll be able to build a variety of impressive gadgets. OpenCV 4 for Secret Agents features a broad selection of projects based on computer vision, machine learning, and several application frameworks. To enable you to build apps for diverse desktop systems and Raspberry Pi, the book supports multiple Python versions, from 2.7 to 3.7. For Android app development, the book also supports Java in Android Studio, and C# in the Unity game engine. Taking inspiration from the world of James Bond, this book will add a touch of adventure and computer vision to your daily routine. You'll be able to protect your home and car with intelligent camera systems that analyze obstacles, people, and even cats. In addition to this, you'll also learn how to train a search engine to praise or criticize the images that it finds, and build a mobile app that speaks to you and responds to your body language. By the end of this book, you will be equipped with the knowledge you need to advance your skills as an app developer and a computer vision specialist. What you will learn Detect motion and recognize gestures to control a smartphone game Detect car headlights and estimate their distance Detect and recognize human and cat faces to trigger an alarm Amplify motion in a real-time video to show heartbeats and breaths Make a physics simulation that detects shapes in a real-world drawing Build OpenCV 4 projects in Python 3 for desktops and Raspberry Pi Develop OpenCV 4 Android applications in Android Studio and Unity Who this book is for If you are an experienced software developer who is new to computer vision or machine learning, and wants to study these topics through creative projects, then this book is for you. The book will also help existing OpenCV users who want upgrade their projects to OpenCV 4 and new versions of other libraries, languages, tools, and operating systems. General familiarity with object-oriented programming, application development, and usage of operating systems (OS), developer tools, and the command line is required.

A Practical Introduction to Computer Vision with OpenCV

This book is for programmers who want to expand their skills by building fun, smart, and useful systems with OpenCV. The projects are ideal in helping you to think creatively about the uses of computer vision, natural user interfaces, and ubiquitous computers (in your home, car, and hand).

OpenCV 4 for Secret Agents

Explains the theory behind basic computer vision and provides a bridge from the theory to practical implementation using the industry standard OpenCV libraries Computer Vision is a rapidly expanding area and it is becoming progressively easier for developers to make use of this field due to the ready availability of high quality libraries (such as OpenCV 2). This text is intended to facilitate the practical use of computer vision with the goal being to bridge the gap between the theory and the practical implementation of computer vision. The book will explain how to use the relevant OpenCV library routines and will be accompanied by a full working program including the code snippets from the text. This textbook is a heavily illustrated, practical introduction to an exciting field, the applications of which are becoming almost ubiquitous. We are now surrounded by cameras, for example cameras on computers & tablets/ cameras built into our mobile phones/ cameras in games consoles; cameras imaging difficult modalities (such as ultrasound, X-ray, MRI) in hospitals, and surveillance cameras. This book is concerned with helping the next generation of computer developers to make use of all these images in order to develop systems which are more intuitive and interact with us in more intelligent ways. Explains the theory behind basic computer vision and provides a bridge from the theory to practical implementation using the industry standard OpenCV libraries Offers an introduction to computer vision, with enough theory to make clear how the various algorithms work but with an emphasis on practical programming issues Provides enough material for a one semester course in computer vision at senior undergraduate and Masters levels Includes the basics of cameras and images and image processing to remove noise, before moving on to topics such as image histogramming; binary imaging; video processing to detect and model moving objects; geometric operations & camera models; edge

detection; features detection; recognition in images Contains a large number of vision application problems to provide students with the opportunity to solve real problems. Images or videos for these problems are provided in the resources associated with this book which include an enhanced eBook

OpenCV for Secret Agents

Expand your knowledge of computer vision by building amazing projects with OpenCV 3 About This Book Build computer vision projects to capture high-quality image data, detect and track objects, process the actions of humans or animals, and much more Discover practical and interesting innovations in computer vision while building atop a mature open-source library, OpenCV 3 Familiarize yourself with multiple approaches and theories wherever critical decisions need to be made Who This Book Is For This book is ideal for you if you aspire to build computer vision systems that are smarter, faster, more complex, and more practical than the competition. This is an advanced book intended for those who already have some experience in setting up an OpenCV development environment and building applications with OpenCV. You should be comfortable with computer vision concepts, object-oriented programming, graphics programming, IDEs, and the command line. What You Will Learn Select and configure camera systems to see invisible light, fast motion, and distant objects Build a “camera trap”, as used by nature photographers, and process photos to create beautiful effects Develop a facial expression recognition system with various feature extraction techniques and machine learning methods Build a panorama Android application using the OpenCV stitching module in C++ with NDK support Optimize your object detection model, make it rotation invariant, and apply scene-specific constraints to make it faster and more robust Create a person identification and registration system based on biometric properties of that person, such as their fingerprint, iris, and face Fuse data from videos and gyroscopes to stabilize videos shot from your mobile phone and create hyperlapse style videos In Detail Computer vision is becoming accessible to a large audience of software developers who can leverage mature libraries such as OpenCV. However, as they move beyond their first experiments in computer vision, developers may struggle to ensure that their solutions are sufficiently well optimized, well trained, robust, and adaptive in real-world conditions. With sufficient knowledge of OpenCV, these developers will have enough confidence to go about creating projects in the field of computer vision. This book will help you tackle increasingly challenging computer vision problems that you may face in your careers. It makes use of OpenCV 3 to work around some interesting projects. Inside these pages, you will find practical and innovative approaches that are battle-tested in the authors' industry experience and research. Each chapter covers the theory and practice of multiple complementary approaches so that you will be able to choose wisely in your future projects. You will also gain insights into the architecture and algorithms that underpin OpenCV's functionality. We begin by taking a critical look at inputs in order to decide which kinds of light, cameras, lenses, and image formats are best suited to a given purpose. We proceed to consider the finer aspects of computational photography as we build an automated camera to assist nature photographers. You will gain a deep understanding of some of the most widely applicable and reliable techniques in object detection, feature selection, tracking, and even biometric recognition. We will also build Android projects in which we explore the complexities of camera motion: first in panoramic image stitching and then in video stabilization. By the end of the book, you will have a much richer understanding of imaging, motion, machine learning, and the architecture of computer vision libraries and applications! Style and approach This book covers a combination of theory and practice. We examine blueprints for specific projects and discuss the principles behind these blueprints, in detail.

A Practical Introduction to Computer Vision with OpenCV, Enhanced Edition

Explore OpenCV 4 to create visually appealing cross-platform computer vision applications Key Features Understand basic OpenCV 4 concepts and algorithms Grasp advanced OpenCV techniques such as 3D reconstruction, machine learning, and artificial neural networks Work with Tesseract OCR, an open-source library to recognize text in images Book Description OpenCV is one of the best open source libraries available, and can help you focus on constructing complete projects on image processing, motion detection, and image segmentation. Whether you're completely new to computer vision, or have a basic understanding

of its concepts, *Learn OpenCV 4 by Building Projects - Second edition* will be your guide to understanding OpenCV concepts and algorithms through real-world examples and projects. You'll begin with the installation of OpenCV and the basics of image processing. Then, you'll cover user interfaces and get deeper into image processing. As you progress through the book, you'll learn complex computer vision algorithms and explore machine learning and face detection. The book then guides you in creating optical flow video analysis and background subtraction in complex scenes. In the concluding chapters, you'll also learn about text segmentation and recognition and understand the basics of the new and improved deep learning module. By the end of this book, you'll be familiar with the basics of Open CV, such as matrix operations, filters, and histograms, and you'll have mastered commonly used computer vision techniques to build OpenCV projects from scratch. What you will learn

- Install OpenCV 4 on your operating system
- Create CMake scripts to compile your C++ application
- Understand basic image matrix formats and filters
- Explore segmentation and feature extraction techniques
- Remove backgrounds from static scenes to identify moving objects for surveillance
- Employ various techniques to track objects in a live video
- Work with new OpenCV functions for text detection and recognition with Tesseract
- Get acquainted with important deep learning tools for image classification

Who this book is for If you are a software developer with a basic understanding of computer vision and image processing and want to develop interesting computer vision applications with OpenCV, *Learn OpenCV 4 by Building Projects* for you. Prior knowledge of C++ will help you understand the concepts covered in this book.

OpenCV 3 Blueprints

Get well versed with state-of-the-art techniques to tailor training processes and boost the performance of computer vision models using machine learning and deep learning techniques

Key Features Develop, train, and use deep learning algorithms for computer vision tasks using TensorFlow 2.x Discover practical recipes to overcome various challenges faced while building computer vision models Enable machines to gain a human level understanding to recognize and analyze digital images and videos

Book Description Computer vision is a scientific field that enables machines to identify and process digital images and videos. This book focuses on independent recipes to help you perform various computer vision tasks using TensorFlow. The book begins by taking you through the basics of deep learning for computer vision, along with covering TensorFlow 2.x's key features, such as the Keras and tf.data.Dataset APIs. You'll then learn about the ins and outs of common computer vision tasks, such as image classification, transfer learning, image enhancing and styling, and object detection. The book also covers autoencoders in domains such as inverse image search indexes and image denoising, while offering insights into various architectures used in the recipes, such as convolutional neural networks (CNNs), region-based CNNs (R-CNNs), VGGNet, and You Only Look Once (YOLO). Moving on, you'll discover tips and tricks to solve any problems faced while building various computer vision applications. Finally, you'll delve into more advanced topics such as Generative Adversarial Networks (GANs), video processing, and AutoML, concluding with a section focused on techniques to help you boost the performance of your networks. By the end of this TensorFlow book, you'll be able to confidently tackle a wide range of computer vision problems using TensorFlow 2.x. What you will learn

- Understand how to detect objects using state-of-the-art models such as YOLOv3
- Use AutoML to predict gender and age from images
- Segment images using different approaches such as FCNs and generative models
- Learn how to improve your network's performance using rank-N accuracy, label smoothing, and test time augmentation
- Enable machines to recognize people's emotions in videos and real-time streams
- Access and reuse advanced TensorFlow Hub models to perform image classification and object detection
- Generate captions for images using CNNs and RNNs

Who this book is for This book is for computer vision developers and engineers, as well as deep learning practitioners looking for go-to solutions to various problems that commonly arise in computer vision. You will discover how to employ modern machine learning (ML) techniques and deep learning architectures to perform a plethora of computer vision tasks. Basic knowledge of Python programming and computer vision is required.

Learn OpenCV 4 by Building Projects

Practical Computer Vision Projects About This Book Updated for OpenCV 3, this book covers new features that will help you unlock the full potential of OpenCV 3 Written by a team of 7 experts, each chapter explores a new aspect of OpenCV to help you make amazing computer-vision aware applications Project-based approach with each chapter being a complete tutorial, showing you how to apply OpenCV to solve complete problems Who This Book Is For This book is for those who have a basic knowledge of OpenCV and are competent C++ programmers. You need to have an understanding of some of the more theoretical/mathematical concepts, as we move quite quickly throughout the book. What You Will Learn Execute basic image processing operations and cartoonify an image Build an OpenCV project natively with Raspberry Pi and cross-compile it for Raspberry Pi.text Extend the natural feature tracking algorithm to support the tracking of multiple image targets on a video Use OpenCV 3's new 3D visualization framework to illustrate the 3D scene geometry Create an application for Automatic Number Plate Recognition (ANPR) using a support vector machine and Artificial Neural Networks Train and predict pattern-recognition algorithms to decide whether an image is a number plate Use POSIT for the six degrees of freedom head pose Train a face recognition database using deep learning and recognize faces from that database In Detail As we become more capable of handling data in every kind, we are becoming more reliant on visual input and what we can do with those self-driving cars, face recognition, and even augmented reality applications and games. This is all powered by Computer Vision. This book will put you straight to work in creating powerful and unique computer vision applications. Each chapter is structured around a central project and deep dives into an important aspect of OpenCV such as facial recognition, image target tracking, making augmented reality applications, the 3D visualization framework, and machine learning. You'll learn how to make AI that can remember and use neural networks to help your applications learn. By the end of the book, you will have created various working prototypes with the projects in the book and will be well versed with the new features of OpenCV3. Style and approach This book takes a project-based approach and helps you learn about the new features by putting them to work by implementing them in your own projects.

TensorFlow 2.0 Computer Vision Cookbook

Gain a working knowledge of advanced machine learning and explore Python's powerful tools for extracting data from images and videos Key FeaturesImplement image classification and object detection using machine learning and deep learningPerform image classification, object detection, image segmentation, and other Computer Vision tasksCrisp content with a practical approach to solving real-world problems in Computer VisionBook Description Python is the ideal programming language for rapidly prototyping and developing production-grade codes for image processing and Computer Vision with its robust syntax and wealth of powerful libraries. This book will help you design and develop production-grade Computer Vision projects tackling real-world problems. With the help of this book, you will learn how to set up Anaconda and Python for the major OSes with cutting-edge third-party libraries for Computer Vision. You'll learn state-of-the-art techniques for classifying images, finding and identifying human postures, and detecting faces within videos. You will use powerful machine learning tools such as OpenCV, Dlib, and TensorFlow to build exciting projects such as classifying handwritten digits, detecting facial features, and much more. The book also covers some advanced projects, such as reading text from license plates from real-world images using Google's Tesseract software, and tracking human body poses using DeeperCut within TensorFlow. By the end of this book, you will have the expertise required to build your own Computer Vision projects using Python and its associated libraries. What you will learnInstall and run major Computer Vision packages within PythonApply powerful support vector machines for simple digit classificationUnderstand deep learning with TensorFlowBuild a deep learning classifier for general imagesUse LSTMs for automated image captioningRead text from real-world imagesExtract human pose data from imagesWho this book is for Python programmers and machine learning developers who wish to build exciting Computer Vision projects using the power of machine learning and OpenCV will find this book useful. The only prerequisite for this book is that you should have a sound knowledge of Python programming.

Mastering OpenCV 3

Delve into practical computer vision and image processing projects and get up to speed with advanced object detection techniques and machine learning algorithms

Key Features

- Discover best practices for engineering and maintaining OpenCV projects
- Explore important deep learning tools for image classification
- Understand basic image matrix formats and filters

Book Description OpenCV is one of the best open source libraries available and can help you focus on constructing complete projects on image processing, motion detection, and image segmentation. This Learning Path is your guide to understanding OpenCV concepts and algorithms through real-world examples and activities. Through various projects, you'll also discover how to use complex computer vision and machine learning algorithms and face detection to extract the maximum amount of information from images and videos. In later chapters, you'll learn to enhance your videos and images with optical flow analysis and background subtraction. Sections in the Learning Path will help you get to grips with text segmentation and recognition, in addition to guiding you through the basics of the new and improved deep learning modules. By the end of this Learning Path, you will have mastered commonly used computer vision techniques to build OpenCV projects from scratch. This Learning Path includes content from the following Packt books: *Mastering OpenCV 4 - Third Edition* by Roy Shilkrot and David Millán Escrivá, *Learn OpenCV 4 By Building Projects - Second Edition* by David Millán Escrivá, Vinícius G. Mendonça, and Prateek Joshi

What you will learn

- Stay up-to-date with algorithmic design approaches for complex computer vision tasks
- Work with OpenCV's most up-to-date API through various projects
- Understand 3D scene reconstruction and Structure from Motion (SfM)
- Study camera calibration and overlay augmented reality (AR) using the ArUco module
- Create CMake scripts to compile your C++ application
- Explore segmentation and feature extraction techniques
- Remove backgrounds from static scenes to identify moving objects for surveillance
- Work with new OpenCV functions to detect and recognize text with Tesseract

Who this book is for If you are a software developer with a basic understanding of computer vision and image processing and want to develop interesting computer vision applications with OpenCV, this Learning Path is for you. Prior knowledge of C++ and familiarity with mathematical concepts will help you better understand the concepts in this Learning Path.

Computer Vision Projects with OpenCV and Python 3

Get started in the rapidly expanding field of computer vision with this practical guide. Written by Adrian Kaehler and Gary Bradski, creator of the open source OpenCV library, this book provides a thorough introduction for developers, academics, roboticists, and hobbyists. You'll learn what it takes to build applications that enable computers to "see" and make decisions based on that data. With over 500 functions that span many areas in vision, OpenCV is used for commercial applications such as security, medical imaging, pattern and face recognition, robotics, and factory product inspection. This book gives you a firm grounding in computer vision and OpenCV for building simple or sophisticated vision applications. Hands-on exercises in each chapter help you apply what you've learned. This volume covers the entire library, in its modern C++ implementation, including machine learning tools for computer vision. Learn OpenCV data types, array types, and array operations

- Capture and store still and video images with HighGUI
- Transform images to stretch, shrink, warp, remap, and repair
- Explore pattern recognition, including face detection
- Track objects and motion through the visual field
- Reconstruct 3D images from stereo vision
- Discover basic and advanced machine learning techniques in OpenCV

Building Computer Vision Projects with OpenCV 4 and C++

Practical OpenCV is a hands-on project book that shows you how to get the best results from OpenCV, the open-source computer vision library. Computer vision is key to technologies like object recognition, shape detection, and depth estimation. OpenCV is an open-source library with over 2500 algorithms that you can use to do all of these, as well as track moving objects, extract 3D models, and overlay augmented reality. It's used by major companies like Google (in its autonomous car), Intel, and Sony; and it is the backbone of the Robot Operating System's computer vision capability. In short, if you're working with computer vision at all, you need to know OpenCV. With Practical OpenCV, you'll be able to:

- Get OpenCV up and running on Windows or Linux.
- Use OpenCV to control the camera board and run vision algorithms on Raspberry Pi.

Understand what goes on behind the scenes in computer vision applications like object detection, image stitching, filtering, stereo vision, and more. Code complex computer vision projects for your class/hobby/robot/job, many of which can execute in real time on off-the-shelf processors. Combine different modules that you develop to create your own interactive computer vision app. What you'll learn The ins and outs of OpenCV programming on Windows and Linux Transforming and filtering images Detecting corners, edges, lines, and circles in images and video Detecting pre-trained objects in images and video Making panoramas by stitching images together Getting depth information by using stereo cameras Basic machine learning techniques BONUS: Learn how to run OpenCV on Raspberry Pi Who this book is for This book is for programmers and makers with little or no previous exposure to computer vision. Some proficiency with C++ is required. Table of ContentsPart 1: Getting comfortable Chapter 1: Introduction to Computer Vision and OpenCV Chapter 2: Setting up OpenCV on your computer Chapter 3: CV Bling – OpenCV inbuilt demos Chapter 4: Basic operations on images and GUI windows Part 2: Advanced computer vision problems and coding them in OpenCV Chapter 5: Image filtering Chapter 6: Shapes in images Chapter 7: Image segmentation and histograms Chapter 8: Basic machine learning and keypoint-based object detection Chapter 9: Affine and Perspective transformations and their applications to image panoramas Chapter 10: 3D geometry and stereo vision Chapter 11: Embedded computer vision: Running OpenCV programs on the Raspberry Pi

Learning OpenCV 3

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 LearnUnderstand 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.

Practical OpenCV

Create image processing, object detection and face recognition apps by leveraging the power of machine learning and deep learning with OpenCV 4 and Qt 5 Key FeaturesGain practical insights into code for all projects covered in this bookUnderstand modern computer vision concepts such as character recognition, image processing and modificationLearn to use a graphics processing unit (GPU) and its parallel processing power for filtering images quicklyBook Description OpenCV and Qt have proven to be a winning combination for developing cross-platform computer vision applications. By leveraging their power, you can create robust applications with both an intuitive graphical user interface (GUI) and high-performance capabilities. This book will help you learn through a variety of real-world projects on image processing, face and text recognition, object detection, and high-performance computing. You'll be able to progressively build on your skills by working on projects of increasing complexity. You'll begin by creating an image viewer application, building a user interface from scratch by adding menus, performing actions based on key-

presses, and applying other functions. As you progress, the book will guide you through using OpenCV image processing and modification functions to edit an image with filters and transformation features. In addition to this, you'll explore the complex motion analysis and facial landmark detection algorithms, which you can use to build security and face detection applications. Finally, you'll learn to use pretrained deep learning models in OpenCV and GPUs to filter images quickly. By the end of this book, you will have learned how to effectively develop full-fledged computer vision applications with OpenCV and Qt. What you will learn

- Create an image viewer with all the basic requirements
- Construct an image editor to filter or transform images
- Develop a security app to detect movement and secure homes
- Build an app to detect facial landmarks and apply masks to faces
- Create an app to extract text from scanned documents and photos
- Train and use cascade classifiers and DL models for object detection
- Build an app to measure the distance between detected objects
- Implement high-speed image filters on GPU with Open Graphics Library (OpenGL)

Who this book is for This book is for engineers and developers who are familiar with both Qt and OpenCV frameworks and are capable of creating simple projects using them, but want to build their skills to create professional-level projects using them. Familiarity with the C++ language is a must to follow the example source codes in this book.

Learn Computer Vision Using OpenCV

Create four mobile apps and explore the world through photography and computer vision

About This Book Efficiently harness iOS and OpenCV to capture and process high-quality images at high speed Develop photographic apps and augmented reality apps quickly and easily Detect, recognize, and morph faces and objects

Who This Book Is For If you want to do computational photography and computer vision on Apple's mobile devices, then this book is for you. No previous experience with app development or OpenCV is required. However, basic knowledge of C++ or Objective-C is recommended. What You Will Learn Use Xcode and Interface Builder to develop iOS apps Obtain OpenCV's standard modules and build extra modules from source Control all the parameters of the iOS device's camera Capture, save, and share photos and videos Analyze colors, shapes, and textures in ordinary and specialized photographs Blend and compare images to create special photographic effects and augmented reality tools Detect faces and morph facial features Classify coins and other objects

In Detail iOS Application Development with OpenCV 3 enables you to turn your smartphone camera into an advanced tool for photography and computer vision. Using the highly optimized OpenCV library, you will process high-resolution images in real time. You will locate and classify objects, and create models of their geometry. As you develop photo and augmented reality apps, you will gain a general understanding of iOS frameworks and developer tools, plus a deeper understanding of the camera and image APIs. After completing the book's four projects, you will be a well-rounded iOS developer with valuable experience in OpenCV. Style and approach The book is practical, creative, and precise. It shows you the steps to create and customize five projects that solve important problems for beginners in mobile app development and computer vision. Complete source code and numerous visual aids are included in each chapter. Experimentation is an important part of the book. You will use computer vision to explore the real world, and then you will refine the projects based on your findings.

Qt 5 and OpenCV 4 Computer Vision Projects

A cookbook of algorithms for common image processing applications Thanks to advances in computer hardware and software, algorithms have been developed that support sophisticated image processing without requiring an extensive background in mathematics. This bestselling book has been fully updated with the newest of these, including 2D vision methods in content-based searches and the use of graphics cards as image processing computational aids. It's an ideal reference for software engineers and developers, advanced programmers, graphics programmers, scientists, and other specialists who require highly specialized image processing. Algorithms now exist for a wide variety of sophisticated image processing applications required by software engineers and developers, advanced programmers, graphics programmers, scientists, and related specialists This bestselling book has been completely updated to include the latest algorithms, including 2D vision methods in content-based searches, details on modern classifier methods, and graphics cards used as

image processing computational aids Saves hours of mathematical calculating by using distributed processing and GPU programming, and gives non-mathematicians the shortcuts needed to program relatively sophisticated applications. Algorithms for Image Processing and Computer Vision, 2nd Edition provides the tools to speed development of image processing applications.

iOS Application Development with OpenCV 3

Blend the power of Qt with OpenCV to build cross-platform computer vision applications Key Features ? Start creating robust applications with the power of OpenCV and Qt combined ? Learn from scratch how to develop cross-platform computer vision applications ? Accentuate your OpenCV applications by developing them with Qt Book Description Developers have been using OpenCV library to develop computer vision applications for a long time. However, they now need a more effective tool to get the job done and in a much better and modern way. Qt is one of the major frameworks available for this task at the moment. This book will teach you to develop applications with the combination of OpenCV 3 and Qt5, and how to create cross-platform computer vision applications. We'll begin by introducing Qt, its IDE, and its SDK. Next you'll learn how to use the OpenCV API to integrate both tools, and see how to configure Qt to use OpenCV. You'll go on to build a full-fledged computer vision application throughout the book. Later, you'll create a stunning UI application using the Qt widgets technology, where you'll display the images after they are processed in an efficient way. At the end of the book, you'll learn how to convert OpenCV Mat to Qt QImage. You'll also see how to efficiently process images to filter them, transform them, detect or track objects as well as analyze video. You'll become better at developing OpenCV applications. What you will learn ? Get an introduction to Qt IDE and SDK ? Be introduced to OpenCV and see how to communicate between OpenCV and Qt ? Understand how to create UI using Qt Widgets ? Learn to develop cross-platform applications using OpenCV 3 and Qt 5 ? Explore the multithreaded application development features of Qt5 ? Improve OpenCV 3 application development using Qt5 ? Build, test, and deploy Qt and OpenCV apps, either dynamically or statically ? See Computer Vision technologies such as filtering and transformation of images, detecting and matching objects, template matching, object tracking, video and motion analysis, and much more ? Be introduced to QML and Qt Quick for iOS and Android application development Who this book is for This book is for readers interested in building computer vision applications. Intermediate knowledge of C++ programming is expected. Even though no knowledge of Qt5 and OpenCV 3 is assumed, if you're familiar with these frameworks, you'll benefit.

Algorithms for Image Processing and Computer Vision

Work on practical computer vision projects covering advanced object detector techniques and modern deep learning and machine learning algorithms Key Features Learn about the new features that help unlock the full potential of OpenCV 4 Build face detection applications with a cascade classifier using face landmarks Create an optical character recognition (OCR) model using deep learning and convolutional neural networks Book Description Mastering OpenCV, now in its third edition, targets computer vision engineers taking their first steps toward mastering OpenCV. Keeping the mathematical formulations to a solid but bare minimum, the book delivers complete projects from ideation to running code, targeting current hot topics in computer vision such as face recognition, landmark detection and pose estimation, and number recognition with deep convolutional networks. You'll learn from experienced OpenCV experts how to implement computer vision products and projects both in academia and industry in a comfortable package. You'll get acquainted with API functionality and gain insights into design choices in a complete computer vision project. You'll also go beyond the basics of computer vision to implement solutions for complex image processing projects. By the end of the book, you will have created various working prototypes with the help of projects in the book and be well versed with the new features of OpenCV4. What you will learn Build real-world computer vision problems with working OpenCV code samples Uncover best practices in engineering and maintaining OpenCV projects Explore algorithmic design approaches for complex computer vision tasks Work with OpenCV's most updated API (v4.0.0) through projects Understand 3D scene reconstruction and Structure from Motion (SfM) Study camera calibration and overlay AR using the ArUco Module Who this book is for

This book is for those who have a basic knowledge of OpenCV and are competent C++ programmers. You need to have an understanding of some of the more theoretical/mathematical concepts, as we move quite quickly throughout the book.

Computer Vision with OpenCV 3 and Qt5

Practical Computer Vision Projects About This Book* Updated for OpenCV 3, this book covers new features that will help you unlock the full potential of OpenCV 3* Written by a team of 7 experts, each chapter explores a new aspect of OpenCV to help you make amazing computer-vision aware applications* Project-based approach with each chapter being a complete tutorial, showing you how to apply OpenCV to solve complete problems Who This Book Is For This book is for those who have a basic knowledge of OpenCV and are competent C++ programmers. You need to have an understanding of some of the more theoretical/mathematical concepts, as we move quite quickly throughout the book. What You Will Learn* Execute basic image processing operations and cartoonify an image* Build an OpenCV project natively with Raspberry Pi and cross-compile it for Raspberry Pi. text* Extend the natural feature tracking algorithm to support the tracking of multiple image targets on a video* Use OpenCV 3's new 3D visualization framework to illustrate the 3D scene geometry* Create an application for Automatic Number Plate Recognition (ANPR) using a support vector machine and Artificial Neural Networks* Train and predict pattern-recognition algorithms to decide whether an image is a number plate* Use POSIT for the six degrees of freedom head pose* Train a face recognition database using deep learning and recognize faces from that database In Detail As we become more capable of handling data in every kind, we are becoming more reliant on visual input and what we can do with those self-driving cars, face recognition, and even augmented reality applications and games. This is all powered by Computer Vision. This book will put you straight to work in creating powerful and unique computer vision applications. Each chapter is structured around a central project and deep dives into an important aspect of OpenCV such as facial recognition, image target tracking, making augmented reality applications, the 3D visualization framework, and machine learning. You'll learn how to make AI that can remember and use neural networks to help your applications learn. By the end of the book, you will have created various working prototypes with the projects in the book and will be well versed with the new features of OpenCV3. Style and approach This book takes a project-based approach and helps you learn about the new features by putting them to work by implementing them in your own projects.

Mastering OpenCV 4

Design and develop advanced computer vision projects using OpenCV with Python About This Book Program advanced computer vision applications in Python using different features of the OpenCV library Practical end-to-end project covering an important computer vision problem All projects in the book include a step-by-step guide to create computer vision applications Who This Book Is For This book is for intermediate users of OpenCV who aim to master their skills by developing advanced practical applications. Readers are expected to be familiar with OpenCV's concepts and Python libraries. Basic knowledge of Python programming is expected and assumed. What You Will Learn Generate real-time visual effects using different filters and image manipulation techniques such as dodging and burning Recognize hand gestures in real time and perform hand-shape analysis based on the output of a Microsoft Kinect sensor Learn feature extraction and feature matching for tracking arbitrary objects of interest Reconstruct a 3D real-world scene from 2D camera motion and common camera reprojection techniques Track visually salient objects by searching for and focusing on important regions of an image Detect faces using a cascade classifier and recognize emotional expressions in human faces using multi-layer perceptrons (MLPs) Recognize street signs using a multi-class adaptation of support vector machines (SVMs) Strengthen your OpenCV2 skills and learn how to use new OpenCV3 features In Detail OpenCV is a native cross platform C++ Library for computer vision, machine learning, and image processing. It is increasingly being adopted in Python for development. OpenCV has C++/C, Python, and Java interfaces with support for Windows, Linux, Mac, iOS, and Android. Developers using OpenCV build applications to process visual data; this can include live streaming data from a device like a camera, such as photographs or videos. OpenCV offers extensive libraries with over 500

functions This book demonstrates how to develop a series of intermediate to advanced projects using OpenCV and Python, rather than teaching the core concepts of OpenCV in theoretical lessons. Instead, the working projects developed in this book teach the reader how to apply their theoretical knowledge to topics such as image manipulation, augmented reality, object tracking, 3D scene reconstruction, statistical learning, and object categorization. By the end of this book, readers will be OpenCV experts whose newly gained experience allows them to develop their own advanced computer vision applications. Style and approach This book covers independent hands-on projects that teach important computer vision concepts like image processing and machine learning for OpenCV with multiple examples.

Mastering OpenCV 3 - Second Edition

Create powerful, accurate, and real-time Computer Vision applications using a perfect blend of algorithms and filters. Also learn about object tracking and foreground extractions with a variety of new filters and algorithms. Key Features Filter, transform, and manipulate images using MAT class and OpenCV Framework Explore motion detection and object tracking with filters and algorithms Build object detectors using deep learning and machine learning algorithms Book Description An arena that has been positively impacted by the advancements in processing power and performance is the field of computer vision. It's only natural that over time, more and more algorithms are introduced to perform computer vision tasks more efficiently. Hands-On Algorithms for Computer Vision is a starting point for anyone who is interested in the field of computer vision and wants to explore the most practical algorithms used by professional computer vision developers. The book starts with the basics and builds up over the course of the chapters with hands-on examples for each algorithm. Right from the start, you will learn about the required tools for computer vision development, and how to install and configure them. You'll explore the OpenCV framework and its powerful collection of libraries and functions. Starting from the most simple image modifications, filtering, and transformations, you will gradually build up your knowledge of various algorithms until you are able to perform much more sophisticated tasks, such as real-time object detection using deep learning algorithms. What you will learn Get to grips with machine learning and artificial intelligence algorithms Read, write, and process images and videos Perform mathematical, matrix, and other types of image data operations Create and use histograms from back-projection images Detect motion, extract foregrounds, and track objects Extract key points with a collection of feature detector algorithms Develop cascade classifiers and use them, and train and test classifiers Employ TensorFlow object detection to detect multiple objects Who this book is for Hands-On Algorithms for Computer Vision helps those who want to learn algorithms in Computer Vision to create and customize their applications. This book will also help existing Computer Vision developers customize their applications. A basic understanding of computer vision and programming experience is needed.

OpenCV with Python Blueprints

Enhance your understanding of Computer Vision and image processing by developing real-world projects in OpenCV 3 About This Book Get to grips with the basics of Computer Vision and image processing This is a step-by-step guide to developing several real-world Computer Vision projects using OpenCV 3 This book takes a special focus on working with Tesseract OCR, a free, open-source library to recognize text in images Who This Book Is For If you are a software developer with a basic understanding of Computer Vision and image processing and want to develop interesting Computer Vision applications with Open CV, this is the book for you. Knowledge of C++ is required. What You Will Learn Install OpenCV 3 on your operating system Create the required CMake scripts to compile the C++ application and manage its dependencies Get to grips with the Computer Vision workflows and understand the basic image matrix format and filters Understand the segmentation and feature extraction techniques Remove backgrounds from a static scene to identify moving objects for video surveillance Track different objects in a live video using various techniques Use the new OpenCV functions for text detection and recognition with Tesseract In Detail Open CV is a cross-platform, free-for-use library that is primarily used for real-time Computer Vision and image processing. It is considered to be one of the best open source libraries that helps developers focus on

constructing complete projects on image processing, motion detection, and image segmentation. Whether you are completely new to the concept of Computer Vision or have a basic understanding of it, this book will be your guide to understanding the basic OpenCV concepts and algorithms through amazing real-world examples and projects. Starting from the installation of OpenCV on your system and understanding the basics of image processing, we swiftly move on to creating optical flow video analysis or text recognition in complex scenes, and will take you through the commonly used Computer Vision techniques to build your own Open CV projects from scratch. By the end of this book, you will be familiar with the basics of Open CV such as matrix operations, filters, and histograms, as well as more advanced concepts such as segmentation, machine learning, complex video analysis, and text recognition. **Style and approach** This book is a practical guide with lots of tips, and is closely focused on developing Computer vision applications with OpenCV. Beginning with the fundamentals, the complexity increases with each chapter. Sample applications are developed throughout the book that you can execute and use in your own projects.

Hands-On Algorithms for Computer Vision

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

OpenCV By Example

Apply the Processing language to tasks involved in computer vision--tasks such as edge and corner detection, recognition of motion between frames in a video, recognition of objects, matching of feature points and shapes in different frames for tracking purposes, and more. You will manipulate images through creative effects, geometric transformation, blending of multiple images, and so forth. Examples are provided. **Pro Processing for Images and Computer Vision with OpenCV** is a step-by-step training tool that guides you through a series of worked examples in linear order. Each chapter begins with a basic demonstration, including the code to recreate it on your own system. Then comes a creative challenge by which to engage and develop mastery of the chapter's topic. The book also includes hints and tips relating to visual arts, interaction design, and industrial best practices. This book is intended for any developer of artistic and otherwise visual applications, such as in augmented reality and digital effects, with a need to manipulate images, and to recognize and manipulate objects within those images. The book is specifically targeted at those making use of the Processing language that is common in artistic fields, and to Java programmers because of Processing's easy integration into the Java programming environment. **What You'll Learn** **Make use of OpenCV, the open source library for computer vision in the Processing environment** **Capture live video streams and examine them frame-by-frame for objects in motion** **Recognize shapes and objects through techniques of detecting lines, edges, corners, and more** **Transform images by scaling, translating, rotating, and additionally through various distortion effects** **Apply techniques such as background subtraction to isolate motion of objects in live video streams** **Detect and track human faces and other objects by matching feature points in different images or video frames** **Who This Book Is For** Media artists, designers, and creative coders

Programming Computer Vision with Python

Learn to capture videos, manipulate images, and track objects with Python using the OpenCV Library Overview Set up OpenCV, its Python bindings, and optional Kinect drivers on Windows, Mac or Ubuntu Create an application that tracks and manipulates faces Identify face regions using normal color images and depth images In Detail Computer Vision can reach consumers in various contexts via webcams, camera phones and gaming sensors like Kinect. OpenCV's Python bindings can help developers meet these consumer demands for applications that capture images, change their appearance and extract information from them, in a high-level language and in a standardized data format that is interoperable with scientific libraries such as NumPy and SciPy. "OpenCV Computer Vision with Python" is a practical, hands-on guide that covers the fundamental tasks of computer vision-capturing, filtering and analyzing images-with step-by-step instructions for writing both an application and reusable library classes. "OpenCV Computer Vision with Python" shows you how to use the Python bindings for OpenCV. By following clear and concise examples you will develop a computer vision application that tracks faces in live video and applies special effects to them. If you have always wanted to learn which version of these bindings to use, how to integrate with cross-platform Kinect drivers and how to efficiently process image data with NumPy and SciPy then this book is for you. What you will learn from this book Install OpenCV and related software such as Python, NumPy, SciPy, OpenNI, and SensorKinect-all on Windows, Mac or Ubuntu Capture, display, and save photos and real-time videos Handle window events and input events using OpenCV's HighGui module or Pygame Understand OpenCV's image format and how to perform efficient operations on OpenCV images with NumPy and SciPy Apply "curves" and other color transformations to simulate the look of old photos, movies or video games Apply an effect only to edges in an image Copy and resize segments of an image Apply an effect only to certain depths in an image by using data from a depth sensor such as Kinect Track faces, eyes, noses and mouths by using prebuilt datasets Track arbitrary objects by creating original datasets Approach A practical, project-based tutorial for Python developers and hobbyists who want to get started with computer vision with OpenCV and Python. Who this book is written for OpenCV Computer Vision with Python is written for Python developers who are new to computer vision and want a practical guide to teach them the essentials. Some understanding of image data (for example, pixels and color channels) would be beneficial. At a minimum you will need access to at least one webcam. Certain exercises require additional hardware like a second webcam, a Microsoft Kinect or an OpenNI-compliant depth sensor such as the Asus Xtion PRO.

Pro Processing for Images and Computer Vision with OpenCV

The best book to learn OpenCV (Open Source Computer Vision) using C++ in fastest possible way. A complete book on OpenCV, focused on applications rather than description. Every application provided in this book has ready to use c++ code and line by line explanation of those codes with visual support. In a nutshell, this book is the best book for beginners who want to work with OpenCV using C++.

OpenCV Computer Vision with Python

If you are a competent C++ programmer and want to learn the tricks of image processing with OpenCV, then this book is for you. A basic understanding of image processing is required.

Open Source Computer Vision for Beginners

Enhance your understanding of Computer Vision and image processing by developing real-world projects in OpenCV 3 About This Book • Get to grips with the basics of Computer Vision and image processing • This is a step-by-step guide to developing several real-world Computer Vision projects using OpenCV 3 • This book takes a special focus on working with Tesseract OCR, a free, open-source library to recognize text in images Who This Book Is For If you are a software developer with a basic understanding of Computer Vision and image processing and want to develop interesting Computer Vision applications with Open CV, this is

the book for you. Knowledge of C++ is required. What You Will Learn

- Install OpenCV 3 on your operating system
- Create the required CMake scripts to compile the C++ application and manage its dependencies
- Get to grips with the Computer Vision workflows and understand the basic image matrix format and filters
- Understand the segmentation and feature extraction techniques
- Remove backgrounds from a static scene to identify moving objects for video surveillance
- Track different objects in a live video using various techniques
- Use the new OpenCV functions for text detection and recognition with Tesseract

In Detail Open CV is a cross-platform, free-for-use library that is primarily used for real-time Computer Vision and image processing. It is considered to be one of the best open source libraries that helps developers focus on constructing complete projects on image processing, motion detection, and image segmentation. Whether you are completely new to the concept of Computer Vision or have a basic understanding of it, this book will be your guide to understanding the basic OpenCV concepts and algorithms through amazing real-world examples and projects. Starting from the installation of OpenCV on your system and understanding the basics of image processing, we swiftly move on to creating optical flow video analysis or text recognition in complex scenes, and will take you through the commonly used Computer Vision techniques to build your own Open CV projects from scratch. By the end of this book, you will be familiar with the basics of Open CV such as matrix operations, filters, and histograms, as well as more advanced concepts such as segmentation, machine learning, complex video analysis, and text recognition. Style and approach This book is a practical guide with lots of tips, and is closely focused on developing Computer vision applications with OpenCV. Beginning with the fundamentals, the complexity increases with each chapter. Sample applications are developed throughout the book that you can execute and use in your own projects.

Learning Image Processing with OpenCV

Learning OpenCV puts you right in the middle of the rapidly expanding field of computer vision. Written by the creators of OpenCV, the widely used free open-source library, this book introduces you to computer vision and demonstrates how you can quickly build applications that enable computers to see and make decisions based on the data. With this book, any developer or hobbyist can get up and running with the framework quickly, whether it's to build simple or sophisticated vision applications.

Opencv by Example

Learning Opencv Computer Vision With The Opencv Library

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