

Software That Sees

2nd Edition
covers OpenCV 2.5



Early Release

Learning

OpenCV

*Computer Vision in C++ with
the OpenCV Library*

O'REILLY®

Adrian Kaehler & Gary Bradski

Learning OpenCV Computer Vision With The OpenCV Library

Joseph Howse, Joe Minichino

Learning Opencv Computer Vision With The Opencv Library:

Learning OpenCV Gary Bradski,Adrian Kaehler,2008-09-24 This library is useful for practitioners and is an excellent tool for those entering the field it is a set of computer vision algorithms that work as advertised William T Freeman Computer Science and Artificial Intelligence Laboratory Massachusetts Institute of Technology Learning OpenCV puts you in the middle of the rapidly expanding field of computer vision Written by the creators of the free open source OpenCV 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 that data Computer vision is everywhere in security systems manufacturing inspection systems medical image analysis Unmanned Aerial Vehicles and more It stitches Google maps and Google Earth together checks the pixels on LCD screens and makes sure the stitches in your shirt are sewn properly OpenCV provides an easy to use computer vision framework and a comprehensive library with more than 500 functions that can run vision code in real time Learning OpenCV will teach any developer or hobbyist to use the framework quickly with the help of hands on exercises in each chapter This book includes A thorough introduction to OpenCV Getting input from cameras Transforming images Segmenting images and shape matching Pattern recognition including face detection Tracking and motion in 2 and 3 dimensions 3D reconstruction from stereo vision Machine learning algorithms Getting machines to see is a challenging but entertaining goal Whether you want to build simple or sophisticated vision applications Learning OpenCV is the book you need to get started

Learning OpenCV Gary Bradski,Adrian Kaehler,2008-10-02 This library is useful for practitioners and is an excellent tool for those entering the field it is a set of computer vision algorithms that work as advertised William T Freeman Computer Science and Artificial Intelligence Laboratory Massachusetts Institute of Technology Learning OpenCV puts you in the middle of the rapidly expanding field of computer vision Written by the creators of the free open source OpenCV 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 that data Computer vision is everywhere in security systems manufacturing inspection systems medical image analysis Unmanned Aerial Vehicles and more It stitches Google maps and Google Earth together checks the pixels on LCD screens and makes sure the stitches in your shirt are sewn properly OpenCV provides an easy to use computer vision framework and a comprehensive library with more than 500 functions that can run vision code in real time Learning OpenCV will teach any developer or hobbyist to use the framework quickly with the help of hands on exercises in each chapter This book includes A thorough introduction to OpenCV Getting input from cameras Transforming images Segmenting images and shape matching Pattern recognition including face detection Tracking and motion in 2 and 3 dimensions 3D reconstruction from stereo vision Machine learning algorithms Getting machines to see is a challenging but entertaining goal Whether you want to build simple or sophisticated vision applications Learning OpenCV is the book you need to get started

Learning OpenCV 3 Computer Vision with Python Joe Minichino,2015 Unleash the power of computer vision with

Python using OpenCV

About This Book

Create impressive applications with OpenCV and Python. Familiarize yourself with advanced machine learning concepts. Harness the power of computer vision with this easy to follow guide.

Who This Book Is For

Intended for novices to the world of OpenCV and computer vision as well as OpenCV veterans that want to learn about what's new in OpenCV 3 this book is useful as a reference for experts and a training manual for beginners or for anybody who wants to familiarize themselves with the concepts of object classification and detection in simple and understandable terms. Basic knowledge about Python and programming concepts is required although the book has an easy learning curve both from a theoretical and coding point of view.

What You Will Learn

- Install and familiarize yourself with OpenCV 3's Python API.
- Grasp the basics of image processing and video analysis.
- Identify and recognize objects in images and videos.
- Detect and recognize faces using OpenCV.
- Train and use your own object classifiers.
- Learn about machine learning concepts in a computer vision context.
- Work with artificial neural networks using OpenCV.
- Develop your own computer vision real life application.

In Detail

OpenCV 3 is a state of the art computer vision library that allows a great variety of image and video processing operations. Some of the more spectacular and futuristic features such as face recognition or object tracking are easily achievable with OpenCV 3. Learning the basic concepts behind computer vision algorithms models and OpenCV's API will enable the development of all sorts of real world applications including security and surveillance. Starting with basic image processing operations the book will take you through to advanced computer vision concepts. Computer vision is a rapidly evolving science whose applications in the real world are exploding so this book will appeal to computer vision novices as well as experts of the subject wanting to learn the brand new OpenCV 3.0. You will build a theoretical foundation of image processing and video analysis and progress to the concepts of classification through machine learning acquiring the technical know how that will allow you to create and use object detectors and classifiers and even track objects in movies or video camera feeds. Finally the journey will end in the world of artificial neural networks along with the development of a hand written digits recognition application.

Style and approach

This book is a comprehensive guide to the brand new OpenCV 3 with Python to develop real life computer vision applications.

[Learning OpenCV 3 Computer Vision with Python](#)

Joe Minichino, Joseph Howse, 2015-09-29

Unleash the power of computer vision with Python using OpenCV.

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Create impressive applications with OpenCV and Python. Familiarize yourself with advanced machine learning concepts. Harness the power of computer vision with this easy to follow guide.

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Learn OpenCV 4.5 with Python 3.7 by Examples James Chen, What This Book is About When you searched for this book you have already known the importance of the OpenCV Python in the fields of computer vision image processing and machine learning This book begins with step by step instructions of installation as well as a simple Hello World then gets into the OpenCV Basics Image Processing Object Detection and finally Machine Learning Key Features Example for every topic all the source codes are available in Github Line by line explanation of the source codes Focus mainly on implementation of algorithms rather than mathematical theories Whom This Book Is For This book is for people with a variety of computer programming levels from those with very limited knowledge of computer vision to the experienced ones The readers do not need to have previous experiences of Python OpenCV No matter you are a beginner or experienced programmer as long as you want to learn OpenCV with Python you will benefit from this book Table of Contents 1 Introduction 1 1 What Is OpenCV 1 2 Whom This Book Is For 1 3 How to Get the Source Codes for This Book 1 4 Hardware Requirements and Software Versions 1 5 How This Book Is Organized 2 Installation 2 1 Install on Windows 2 2 Install Python on Ubuntu 2 3 Configure PyCharm and Install OpenCV 3 OpenCV Basics 3 1 Load and Display Images 3 2 Load and Display Videos 3 3 Display Webcam 3 4 Play Youtube Video 3 5 Image Fundamentals 3 6 Draw Shapes 3 7 Draw Texts 3 8 Draw an OpenCV like Icon 4 User Interaction 4 1 Mouse Operations 4 2 Draw Circles with Mouse 4 3 Draw Polygon with Mouse 4 4 Crop an Image with Mouse 4 5 Input Values with Trackbars 5 Image Processing 5 1 Change Color Spaces 5 2 Resize Crop and Rotate an Image 5 3 Adjust Contrast and Brightness of an Image 5 4 Adjust Hue Saturation and Value 5 5 Blend Image 5

6 Bitwise Operation 5 7 Warp Image 5 8 Blur Image 5 9 Histogram 6 Object Detection 6 1 Canny Edge Detection 6 2 Dilation and Erosion 6 3 Shape Detection 6 4 Color Detection 6 5 Text Recognition with Tesseract 6 6 Human Detection 6 7 Face and Eye Detection 6 8 Remove Background 6 9 Blur Background 7 Machine Learning 7 1 K Means Clustering 7 2 K Nearest Neighbors 7 3 Support Vector Machine 7 4 Artificial Neural Network ANN About the Author Index *OpenCV 4 Computer Vision Application Programming Cookbook* David Millán Escrivá, Robert Laganiere, 2019-05-03 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 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 *Learn Computer Vision Using OpenCV* Sunila Gollapudi, 2019-04-26 Build practical applications of computer vision using the OpenCV library with Python This book discusses different facets of computer vision such as image and object detection, tracking, and motion analysis and their applications with examples The author starts with an introduction to computer vision followed by setting up OpenCV from scratch using Python The next section discusses specialized image processing and segmentation and how images are stored and processed by a computer This involves pattern recognition and image tagging using the OpenCV library Next you'll work with object detection, video storage and interpretation, and human

detection using OpenCV Tracking and motion is also discussed in detail The book also discusses creating complex deep learning models with CNN and RNN The author finally concludes with recent applications and trends in computer vision After reading this book you will be able to understand and implement computer vision and its applications with OpenCV using Python You will also be able to create deep learning models with CNN and RNN and understand how these cutting edge deep learning architectures work What You Will Learn Understand what computer vision is and its overall application in intelligent automation systems Discover the deep learning techniques required to build computer vision applications Build complex computer vision applications using the latest techniques in OpenCV Python and NumPy Create practical applications and implementations such as face detection and recognition handwriting recognition object detection and tracking and motion analysis Who This Book Is For Those who have a basic understanding of machine learning and Python and are looking to learn computer vision and its applications

Learning OpenCV, 2nd Edition Adrian Kaehler, Gary Bradski, 2014 Learning OpenCV puts you in the middle of the rapidly expanding field of computer vision Written by the creators of the free open source OpenCV 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 that data The second edition is updated to cover new features and changes in OpenCV 2.0 especially the C interface

OpenCV 3 Computer Vision with Python Cookbook Aleksei Spizhevoi, Aleksandr Rybnikov, 2018-03-23 OpenCV 3 is a native cross platform library for computer vision machine learning and image processing OpenCV's convenient high level APIs hide very powerful internals designed for computational efficiency that can take advantage of multicore and GPU processing This book will help you tackle increasingly challenging computer vision problems

Learning OpenCV 3 Adrian Kaehler, Gary Bradski, 2016 *Learning OpenCV 4 Computer Vision with Python 3* Joseph Howse, Joe Minichino, 2020-02-20 Updated for OpenCV 4 and Python 3 this book covers the latest on depth cameras 3D tracking augmented reality and deep neural networks helping you solve real world computer vision problems with practical code Key Features Build powerful computer vision applications in concise code with OpenCV 4 and Python 3 Learn the fundamental concepts of image processing object classification and 2D and 3D tracking Train use and understand machine learning models such as Support Vector Machines SVMs and neural networks Book Description

Computer vision is a rapidly evolving science encompassing diverse applications and techniques This book will not only help those who are getting started with computer vision but also experts in the domain You'll be able to put theory into practice by building apps with OpenCV 4 and Python 3 You'll start by understanding OpenCV 4 and how to set it up with Python 3 on various platforms Next you'll learn how to perform basic operations such as reading writing manipulating and displaying still images videos and camera feeds From taking you through image processing video analysis and depth estimation and segmentation to helping you gain practice by building a GUI app this book ensures you'll have opportunities for hands on activities Next you'll tackle two popular challenges face detection and face recognition You'll also learn about object

classification and machine learning concepts which will enable you to create and use object detectors and classifiers and even track objects in movies or video camera feed. Later you'll develop your skills in 3D tracking and augmented reality. Finally you'll cover ANNs and DNNs learning how to develop apps for recognizing handwritten digits and classifying a person's gender and age. By the end of this book you'll have the skills you need to execute real world computer vision projects. What you will learn: Install and familiarize yourself with OpenCV 4's Python 3 bindings. Understand image processing and video analysis basics. Use a depth camera to distinguish foreground and background regions. Detect and identify objects and track their motion in videos. Train and use your own models to match images and classify objects. Detect and recognize faces and classify their gender and age. Build an augmented reality application to track an image in 3D. Work with machine learning models including SVMs, artificial neural networks, ANNs, and deep neural networks, DNNs.

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

OpenCV 3 Blueprints Joseph Howse, Steven Puttemans, Quan Hua, Utkarsh Sinha, 2015-11-10

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 *Learning OpenCV* Samyak Datta,2016-12-30 Build create and deploy your computer vision application with OpenCVAbout This Book This book provides hands on examples that cover the major features that are part of any important Computer Vision application It explores important algorithms that allow you to recognize faces identify objects track camera movements and much more We share best practices and tips so you appreciate the power of OpenCVWho This Book Is ForThis is the perfect book for anyone who wants to dive into the exciting world of image processing and computer vision This book is aimed at programmers with a working knowledge of C Prior knowledge of OpenCV or Computer Vision Machine Learning is not required What You Will Learn Explore the steps involved in building a typical computer vision machine learning application Understand the relevance of OpenCV at every stage of building an application Harness the the vast amount of information that lies hidden in images into the apps you build Incorporate visual information in your apps to create more appealing software Get acquainted with how large scale and popular image editing apps such as Instagram work behind the scenes Get a glimpse of how the image filters in apps can be recreated using simple operations in OpenCV Appreciate how difficult it is for a computer program to perform tasks that are trivial for human beings Get to know how to develop applications that perform face detection gender detection from facial images and handwritten character digit recognitionIn DetailComputer vision and machine learning concepts are frequently used in practical computer vision based projects If you re a novice this book provides the steps involved in building and deploying an end to end application in the domain of computer vision using

OpenCV C It starts with instructions on how to install the library and ends with you having developed an application that does something tangible and useful in computer vision machine learning At the outset we explain how to install OpenCV and demonstrate how to run some simple programs You will start with images the building blocks of image processing applications and see how they are stored and processed by OpenCV You'll get comfortable with OpenCV specific jargon Mat Point Scalar and so on and get to know how to traverse images and perform basic pixel wise operations Building upon this we introduce slightly more advanced image processing concepts such as filtering thresholding and edge detection In the latter parts the book touches upon more complex and ubiquitous concepts such as face detection using Haar cascade classifiers interest point detection algorithms and feature descriptors You will now begin to appreciate the true power of the library in how it reduces mathematically non trivial algorithms to a single line of code The concluding sections will touch upon OpenCV's Machine Learning module You will witness not only how OpenCV helps you pre process and extract features from images that are relevant to the problems you are trying to solve but also how to use Machine Learning algorithms that work on these features to make intelligent predictions [Learn OpenCV with Python by Examples](#) James Chen,2023-05

Machine Learning for OpenCV Michael Beyeler,2017-07-14 Expand your OpenCV knowledge and master key concepts of machine learning using this practical hands on guide About This Book Load store edit and visualize data using OpenCV and Python Grasp the fundamental concepts of classification regression and clustering Understand perform and experiment with machine learning techniques using this easy to follow guide Evaluate compare and choose the right algorithm for any task Who This Book Is For This book targets Python programmers who are already familiar with OpenCV this book will give you the tools and understanding required to build your own machine learning systems tailored to practical real world tasks What You Will Learn Explore and make effective use of OpenCV's machine learning module Learn deep learning for computer vision with Python Master linear regression and regularization techniques Classify objects such as flower species handwritten digits and pedestrians Explore the effective use of support vector machines boosted decision trees and random forests Get acquainted with neural networks and Deep Learning to address real world problems Discover hidden structures in your data using k means clustering Get to grips with data pre processing and feature engineering In Detail Machine learning is no longer just a buzzword it is all around us from protecting your email to automatically tagging friends in pictures to predicting what movies you like Computer vision is one of today's most exciting application fields of machine learning with Deep Learning driving innovative systems such as self driving cars and Google's DeepMind OpenCV lies at the intersection of these topics providing a comprehensive open source library for classic as well as state of the art computer vision and machine learning algorithms In combination with Python Anaconda you will have access to all the open source computing libraries you could possibly ask for Machine learning for OpenCV begins by introducing you to the essential concepts of statistical learning such as classification and regression Once all the basics are covered you will start exploring

various algorithms such as decision trees support vector machines and Bayesian networks and learn how to combine them with other OpenCV functionality As the book progresses so will your machine learning skills until you are ready to take on today s hottest topic in the field Deep Learning By the end of this book you will be ready to take on your own machine learning problems either by building on the existing source code or developing your own algorithm from scratch Style and approach OpenCV machine learning connects the fundamental theoretical principles behind machine learning to their practical applications in a way that focuses on asking and answering the right questions This book walks you through the key elements of OpenCV and its powerful machine learning classes while demonstrating how to get to grips with a range of models

[Deep Learning for Computer Vision](#) Rajalingappa 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

OpenCV: Computer Vision Projects with Python Joseph Howse,Prateek Joshi,Michael Beyeler,2016-10-24 Get savvy with OpenCV and actualize cool computer vision applicationsAbout This Book Use OpenCV s Python bindings to capture video manipulate images and track objects Learn about the different functions of OpenCV and their actual implementations

Develop a series of intermediate to advanced projects using OpenCV and PythonWho This Book Is ForThis learning path is for someone who has a working knowledge of Python and wants to try out OpenCV This Learning Path will take you from a beginner to an expert in computer vision applications using OpenCV OpenCV s application are humongous and this Learning Path is the best resource to get yourself acquainted thoroughly with OpenCV What You Will Learn Install OpenCV and related software such as Python NumPy SciPy OpenNI and SensorKinect all on Windows Mac or Ubuntu Apply curves and other color transformations to simulate the look of old photos movies or video games Apply geometric transformations to images perform image filtering and convert an image into a cartoon like image Recognize hand gestures in real time and perform hand shape analysis based on the output of a Microsoft Kinect sensor Reconstruct a 3D real world scene from 2D camera motion and common camera reprojection techniques Detect and recognize street signs using a cascade classifier and support vector machines SVMs Identify emotional expressions in human faces using convolutional neural networks CNNs and SVMs Strengthen your OpenCV2 skills and learn how to use new OpenCV3 featuresIn DetailOpenCV is a state of art computer vision library that allows a great variety of image and video processing operations OpenCV for Python enables us to run computer vision algorithms in real time This learning path proposes to teach the following topics First we will learn how to get started with OpenCV and OpenCV3 s Python API and develop a computer vision application that tracks body parts Then we will build amazing intermediate level computer vision applications such as making an object disappear from an image identifying different shapes reconstructing a 3D map from images and building an augmented reality application Finally we ll move to more advanced projects such as hand gesture recognition tracking visually salient objects as well as recognizing traffic signs and emotions on faces using support vector machines and multi layer perceptrons respectively This Learning Path combines some of the best that Packt has to offer in one complete curated package It includes content from the following Packt products OpenCV Computer Vision with Python by Joseph Howse OpenCV with Python By Example by Prateek Joshi OpenCV with Python Blueprints by Michael BeyelerStyle and approachThis course aims to create a smooth learning path that will teach you how to get started with will learn how to get started with OpenCV and OpenCV 3 s Python API and develop superb computer vision applications Through this comprehensive course you ll learn to create computer vision applications from scratch to finish and more *Frontiers of Manufacturing Science and Measuring Technology III* Wen Pei Sung,Jimmy Chih Ming Kao,Ran Chen,2013-09-03 Selected peer reviewed papers from the 2013 3rd International Conference on Frontiers of Manufacturing Science and Measuring Technology ICFMM 2013 July 30 31 2013 Lijiang China

Learning OpenCV 5 Computer Vision with Python Joseph Howse,Joe Minichino,2023-03 Updated for OpenCV 5 this book covers the latest on depth cameras 3D navigation deep neural networks and Cloud computing helping you solve real world computer vision problems with practical codeKey Features Build powerful computer vision applications in concise code with OpenCV 5 and Python 3 Learn the fundamental concepts of image processing object classification and 2D and 3D

tracking Train use and understand machine learning models and deploy them in the CloudBook DescriptionComputer vision is a rapidly evolving science in the field of artificial intelligence encompassing diverse use cases and techniques This book will not only help those who are getting started with computer vision but also experts in the domain You ll be able to put theory into practice by building apps with OpenCV 5 and Python 3 You ll start by setting up OpenCV 5 with Python 3 on various platforms Next you ll learn how to perform basic operations such as reading writing manipulating and displaying images videos and camera feeds From taking you through image processing video analysis depth estimation and segmentation to helping you gain practice by building a GUI app this book ensures you ll have opportunities for hands on activities You ll tackle two popular challenges face detection and face recognition You ll also learn about object classification and machine learning which will enable you to create and use object detectors and even track moving objects in real time Later you ll develop your skills in augmented reality and real world 3D navigation Finally you ll cover ANNs and DNNs learning how to develop apps for recognizing handwritten digits and classifying a person s gender and age and you ll deploy your solutions to the Cloud By the end of this book you ll have the skills you need to execute real world computer vision projects What you will learn Install and familiarize yourself with OpenCV 5 s Python 3 bindings Understand image processing and video analysis Use a depth camera to distinguish foreground and background regions Detect and identify objects and track their motion in videos Train and use your own models to match images and classify objects Detect and recognize faces and classify their gender and age Build augmented reality applications and navigate the real 3D world Train neural networks and deploy them as Cloud based solutionsWho This Book Is ForThis OpenCV book is a good fit for Python programmers who want to get started with computer vision and machine learning This book will also be useful for Computer vision and AI ML developers who want to expand their OpenCV skills as well as experts who want to stay up to date with OpenCV 5

Learn

OpenCV 4 by Building Projects David Millán Escrivá,Vinícius G. Mendonça,Prateek Joshi,2018-11-30 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 OpenCV 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.

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