Opencv Essentials

OpenCV EssentialsOpenCV 3 BlueprintsOpenCV for Secret AgentsLearning OpenCV 3Learning Image Processing with OpenCVLearn OpenCV with Python by ExamplesOpenCV 3 Computer Vision with Python CookbookMachine Learning in OpenCVOpen Source Computer Vision for BeginnersOpenCV 4 with Python Blueprints, Second EditionMastering OpenCV 4 with PythonOpenCV 3 Computer Vision Application Programming Cookbook - Third EditionMastering OpenCV 4Learning OpenCVOpenCV Computer Vision Application Programming CookbookOpenCV Computer Vision Application Programming Cookbook Second Edition Oscar Deniz Suarez Joseph Howse Joseph Howse Adrian Kaehler Gloria Bueno Garcia James Chen Alexey Spizhevoy Adrian Tam Nuruzzaman Faruqui Menua Gevorgyan Alberto Fernández Villán Robert Laganiere Roy Shilkrot Gary Bradski J. Caro Robert Laganière

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this book is intended for c developers who want to learn how to implement the main techniques of opencv and get started with it quickly working experience with computer vision image processing is expected

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

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

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

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

this book is a comprehensive guide to learning the basics of computer vision and machine learning using the powerful opencv library and the python programming language the book offers a practical hands on approach to learning the concepts and techniques of computer vision through practical examples all codes in this book are available on github through a series of examples the book covers a wide range of topics including image and video processing feature detection object detection and recognition machine learning and deep neural networks each chapter includes detailed explanations of the concepts and techniques involved as well as practical examples and code snippets demonstrating how to implement them in python throughout the book readers will work through hands on examples and projects learning how to build image processing applications from scratch whether you are a beginner or an experienced programmer this book provides a valuable resource for learning computer vision with opencv and python the clear and concise writing style makes it easy for readers to follow along and the numerous examples ensure that readers can practice and apply what they have learned by the end of the book readers will have a solid understanding of the fundamentals of computer vision and be able to build their own computer vision applications with confidence this book is an excellent resource for anyone looking to learn computer vision and machine learning using the opencv library and python programming language table of contents 1 introduction 1 1 about opencv 1 2 target audients of this book 1 3 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 image fundamentals 3 5 draw shapes 3 6 draw texts 3 7 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 conversion of 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 7 5 convolutional neural network cnn references about the author

opencv 3 is a native cross platform library for computer vision machine learning and image

processing this book will help you tackle increasingly challenging computer vision problems by providing number of recipes that you can use to improvise your existing applications in this book you will learn how to process an image by manipulating pixels and analyze an image using histograms we ll guide you through segmenting images into homogeous regions and extracting meaningful objects then you ll learn how to apply image filters to enhance image content and exploit the image geometry in order to relay different views of a pictured scene we ll explore techniques to achieve camera calibration and perform multiple view analysis later you ll work on converting low level pixel information to high level concepts for applications such as object detection recognition and scene monitoring you ll discover how to process video from files or cameras and how to detect and track moving objects finally you ll get acquainted with recent approaches in deep learning object classification and neural networks by the end of the book you ll be able to apply your skills in opencv to create and explore computer vision applications in various domains

this ebook is written in an engaging and approachable style you re familiar with from the machine learning mastery series discover exactly how to get started and use the machine learning capability in opencv that many people often overlook

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

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

create advanced applications with python and opencv exploring the potential of facial recognition machine learning deep learning web computing and augmented reality key features develop your computer vision skills by mastering algorithms in open source computer vision 4 opencv 4 and python apply machine learning and deep learning techniques with tensorflow keras and pytorch discover the modern design patterns you should avoid when developing efficient computer vision applications book description opencv is considered to be one of the best open source computer vision and machine learning software libraries it helps developers build complete projects in relation to image processing motion detection or image segmentation among many others opencv for python enables you to run computer vision algorithms smoothly in real time combining the best of the opencv c api and the python language in this book you ll get started by setting up opencv and delving into the key concepts of computer vision you ll then proceed to study more advanced concepts and discover the full potential of opencv the book will also introduce you to the creation of advanced applications using python and opencv enabling you to develop applications that include facial recognition target tracking or augmented reality next you ll learn machine learning techniques and concepts understand how to apply them in real world examples and also explore their benefits including real time data production and faster data processing you ll also discover how to translate the functionality provided by opencv into optimized application code projects using python bindings toward the concluding chapters you ll explore the application of artificial intelligence and deep learning techniques using the popular python libraries tensorflow and keras by the end of this book you ll be able to develop advanced computer vision applications to meet your customers demands what you will learn handle files and images and explore various image processing techniques explore image transformations including translation resizing and cropping gain insights into building histograms brush up on contour detection filtering and drawing work with augmented reality to build marker based and markerless applications work with the main machine learning algorithms in opencv explore the deep learning python libraries and opencv deep learning capabilities create computer vision and deep learning web applications who this book is for this book is designed for computer vision developers engineers and researchers who want to develop modern computer vision applications basic experience of opencv and python programming is a must

over 100 recipes to help you build computer vision applications that make the most of the popular c library opencv 3about 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 imageswho 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 techniquesin 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

providing an introduction to computer vision the technology that enables computers to see and make decisions based on the data this book explains how developers students and hobbyists can add vision to their projects using opencv the widely used free open source computer vision library

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

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 packtpub com if you purchased this book elsewhere you can visit packtpub com support and register to have the files e mailed directly to you

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