

Computer Vision with OpenCV 3 and Qt5

Build visually appealing, multithreaded, cross-platform
computer vision applications

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By Amin Ahmadi Tazehkandi

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**David Millán Escrivá, Prateek
Joshi, Vinícius G. Mendonça, Roy
Shilkrot**

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Computer Vision with OpenCV 3 and Qt5 : Build Visually Appealing, Multithreaded, Cross-platform Computer Vision Applications Amin Ahmadi Tazehkandi, *Learning OpenCV 3* Adrian Kaehler, Gary Bradski, 2016-12-14 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 *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 **Building Computer Vision Projects with OpenCV 4 and C++** David Millán Escrivá, Prateek Joshi, Vinícius G. Mendonça, Roy Shilkrot, 2019-03-26 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 Mil n Escriv Learn OpenCV 4 By Building Projects Second Edition by David Mil n Escriv Vin cius G Mendon a and Prateek JoshiWhat you will learnStay up to date with algorithmic design approaches for complex computer vision tasksWork with OpenCV s most up to date API through various projectsUnderstand 3D scene reconstruction and Structure from Motion SfM Study camera calibration and overlay augmented reality AR using the ArUco moduleCreate CMake scripts to compile your C applicationExplore segmentation and feature extraction techniquesRemove backgrounds from static scenes to identify moving objects for surveillanceWork with new OpenCV functions to detect and recognize text with TesseractWho 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

[A Practical Introduction to Computer Vision with OpenCV, Enhanced Edition](#) Kenneth Dawson-Howe,2014-04-24 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 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 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

Mastering OpenCV 4 Roy Shilkrot,2018 **OpenCV Computer Vision Application Programming Cookbook Second Edition** Robert Laganière,2014-08-26 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 course. It constitutes an excellent reference for graduate students and researchers in image processing and computer vision.

Mastering OpenCV 4 Roy Shilkrot, David Millán Escrivá, 2018-12-27 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 OpenCV 4.

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.

OpenCV Essentials Oscar Deniz Suarez, M^a del Milagro Fernández Carrobles, Noelia Váñez Enano, Gloria Bueno García, Ismael Serrano Gracia, Julio Alberto Patón Incertis, Jesus Salido Tercero, 2014-08-25 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.

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 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 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 [A Practical Introduction to Computer Vision with OpenCV](#) Kenneth Dawson-Howe, 2014-03-20 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 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 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 [Mastering OpenCV 3](#) Daniel Lelis Baggio, Shervin Emami, David Millan Escriva, Khvedchenia Ievgen, Jason Saragih, Roy Shilkrot, 2017-04-28 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

OpenCV 3 Computer Vision Application

Programming Cookbook - Third Edition Robert Laganiere, 2016-12-30 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 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 faces and people in images using machine learning techniques 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

Computer Vision Projects with OpenCV and Python 3 Matthew Rever, 2018-12-28 Gain a working knowledge of advanced machine learning and explore Python s powerful tools for extracting data from images and videos Key Features Implement image classification and object detection using machine learning and deep learning Perform image classification object detection image

segmentation and other Computer Vision tasks

Crisp content with a practical approach to solving real world problems in Computer Vision

Book 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 will 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 learn

- Install and run major Computer Vision packages within Python
- Apply powerful support vector machines for simple digit classification
- Understand deep learning with TensorFlow
- Build a deep learning classifier for general images
- Use LSTMs for automated image captioning
- Read text from real world images
- Extract human pose data from images

Who 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

[OpenCV 4 Computer Vision Application Programming Cookbook](#) David Millán Escrivá, Robert Laganieri, 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 will 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 will understand how you can process images with classes and count pixels with histograms

You will also learn detecting describing and matching interest points

As you advance through the chapters you will get to grips with estimating projective relations in images reconstructing 3D scenes processing video sequences and tracking visual motion

In the final chapters you will cover deep learning concepts such as face and object detection

By the end of the book you will 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

Qt 5 and OpenCV 4 Computer Vision Projects Zhuo Qingliang, 2019-06-21 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 Features Gain practical insights into code for all projects covered in this book Understand modern computer vision concepts such as character recognition image processing and modification Learn to use a graphics processing unit GPU and its parallel processing power for filtering images quickly Book 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

[Learning OpenCV 3 Computer Vision with Python](#) Joe Minichino, Joseph Howse, 2015-09-29 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 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

OpenCV 3 Computer Vision Application

Programming Cookbook Robert Laganier, 2017-02-09 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 will 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 will 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.

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 code.

Key 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 Cloud

Book Description Computer 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 will be able to put theory into practice by building apps with OpenCV 5 and Python 3. You will start by setting up OpenCV 5 with Python 3 on various platforms. Next you will 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 will 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 solutions

Who This Book Is For

This 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

Delve into the emotional tapestry woven by in Dive into the Emotion of **Computer Vision With Opencv 3 And Qt5 Ebook Now** . This ebook, available for download in a PDF format (Download in PDF: *), is more than just words on a page; it's a journey of connection and profound emotion. Immerse yourself in narratives that tug at your heartstrings. Download now to experience the pulse of each page and let your emotions run wild.

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