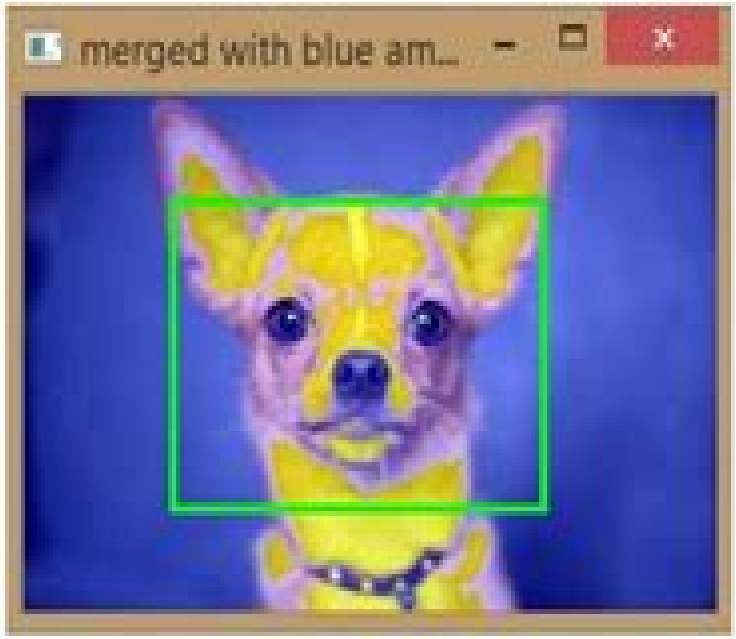
Image Processing

OpenCV

python



Opencv With Python By Example

Gabriel Garrido

Opencv With Python By Example:

Learn OpenCV with Python by Examples James Chen,2023-03-27 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 *Learn OpenCV with Python by Examples* James Chen,2023-05 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 learn the concepts and techniques of computer vision through practical example All codes in this book are available at 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 that demonstrate 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 5 2 Installation 13 2 1 Install on Windows 14 2 2 Install Python on Ubuntu 16 2 3 Configure PyCharm and Install OpenCV 18 3 OpenCV Basics 25 3 1 Load and Display Images 26 3 2 Load and Display Videos 30 3 3 Display Webcam 32 3 4 Image Fundamentals 35 3 5 Draw Shapes 42 3 6 Draw Texts 48 3 7 Draw an OpenCV like Icon 50 4 User Interaction 52 4 1 Mouse Operations 53 4 2 Draw Circles with Mouse 56 4 3 Draw Polygon with Mouse 60 4 4 Crop an Image with Mouse 62 4 5 Input Values with Trackbars 64 5 Image Processing 70 5 1 Conversion of Color Spaces 72 5 2 Resize Crop and Rotate an Image 77 5 3 Adjust Contrast and Brightness of an Image 83 5 4 Adjust Hue Saturation and Value 87 5 5 Blend Image 91 5 6 Bitwise Operation 94 5 7 Warp Image 101 5 8 Blur Image 107 5 9 Histogram 114 6 Object Detection 120 6 1 Canny Edge Detection 122 6 2 Dilation and Erosion 125 6 3 Shape Detection 129 6 4 Color Detection 139 6 5 Text Recognition with Tesseract 150 6 6 Human Detection 161 6 7 Face and Eye Detection 165 6 8 Remove Background 170 6 9 Blur Background 189 7 Machine Learning 196 7 1 K Means Clustering 200 7 2 K Nearest Neighbors 216 7 3 Support Vector Machine 237 7 4 Artificial Neural Network ANN 254 7 5 Convolutional Neural Network CNN 276 Index 305 References 308 About the Author 310 **Opencv with Python by Example** Prateek Joshi,2015-09-22 Build real world computer vision applications and develop cool demos using OpenCV for PythonAbout This Book Learn how to apply complex visual effects to images using geometric transformations and image filters Extract features from an image and use them to develop advanced applications Build algorithms to help you understand the image content and perform visual searchesWho This Book Is ForThis book is intended for Python developers who are new to OpenCV and want to develop computer vision applications with OpenCV Python This book is also useful for generic software developers who want to deploy computer vision applications on the cloud It would be helpful to have some familiarity with basic mathematical concepts such as vectors matrices and so on What You Will Learn Apply geometric transformations to images perform image filtering and convert an image into a cartoon like image Detect and track various body parts such as the face nose eyes ears and mouth Stitch multiple images of a scene together to create a panoramic image Make an object disappear from an image Identify different shapes segment an image and track an object

in a live video Recognize an object in an image and build a visual search engine Reconstruct a 3D map from images Build an augmented reality applicationIn DetailComputer vision is found everywhere in modern technology OpenCV for Python enables us to run computer vision algorithms in real time With the advent of powerful machines we are getting more processing power to work with Using this technology we can seamlessly integrate our computer vision applications into the cloud Web developers can develop complex applications without having to reinvent the wheel This book will walk you through all the building blocks needed to build amazing computer vision applications with ease We start off with applying geometric transformations to images We then discuss affine and projective transformations and see how we can use them to apply cool geometric effects to photos We will then cover techniques used for object recognition 3D reconstruction stereo imaging and other computer vision applications This book will also provide clear examples written in Python to build OpenCV applications The book starts off with simple beginner s level tasks such as basic processing and handling images image mapping and detecting images It also covers popular OpenCV libraries with the help of examples The book is a practical tutorial that covers various examples at different levels teaching you about the different functions of OpenCV and their actual implementation Style and approachThis is a conversational style book filled with hands on examples that are really easy to understand Each topic is explained very clearly and is followed by a programmatic implementation so that the concept is solidified Each topic contributes to something bigger in the following chapters which helps you understand how to piece things together to build something big and complex **OpenCV 3.x with Python By Example** Gabriel Garrido Calvo,Prateek Joshi,2018-01-17 Learn the techniques for object recognition 3D reconstruction stereo imaging and other computer vision applications using examples on different functions of OpenCV Key Features Learn how to apply complex visual effects to images with OpenCV 3 x and Python Extract features from an image and use them to develop advanced applications Build algorithms to help you understand image content and perform visual searches Get to grips with advanced techniques in OpenCV such as machine learning artificial neural network 3D reconstruction and augmented reality Book Description Computer vision is found everywhere in modern technology OpenCV for Python enables us to run computer vision algorithms in real time With the advent of powerful machines we have more processing power to work with Using this technology we can seamlessly integrate our computer vision applications into the cloud Focusing on OpenCV 3 x and Python 3 6 this book will walk you through all the building blocks needed to build amazing computer vision applications with ease We start off by manipulating images using simple filtering and geometric transformations We then discuss affine and projective transformations and see how we can use them to apply cool advanced manipulations to your photos like resizing them while keeping the content intact or smoothly removing undesired elements We will then cover techniques of object tracking body part recognition and object recognition using advanced techniques of machine learning such as artificial neural network 3D reconstruction and augmented reality techniques are also included The book covers popular OpenCV

libraries with the help of examples This book is a practical tutorial that covers various examples at different levels teaching you about the different functions of OpenCV and their actual implementation By the end of this book you will have acquired the skills to use OpenCV and Python to develop real world computer vision applications What you will learn Detect shapes and edges from images and videos How to apply filters on images and videos Use different techniques to manipulate and improve images Extract and manipulate particular parts of images and videos Track objects or colors from videos Recognize specific object or faces from images and videos How to create Augmented Reality applications Apply artificial neural networks and machine learning to improve object recognition Who this book is for This book is intended for Python developers who are new to OpenCV and want to develop computer vision applications with OpenCV and Python This book is also useful for generic software developers who want to deploy computer vision applications on the cloud It would be helpful to have some familiarity with basic mathematical concepts such as vectors matrices and so on Programming Computer Vision with Python Jan Erik Solem,2012-06-19 If you want a basic understanding of computer vision s underlying theory and algorithms this hands on introduction is the ideal place to start You ll learn techniques for object recognition 3D reconstruction stereo imaging augmented reality and other computer vision applications as you follow clear examples written in Python Programming Computer Vision with Python explains computer vision in broad terms that won t bog you down in theory You get complete code samples with explanations on how to reproduce and build upon each example along with exercises to help you apply what you ve learned This book is ideal for students researchers and enthusiasts with basic programming and standard mathematical skills Learn techniques used in robot navigation medical image analysis and other computer vision applications Work with image mappings and transforms such as texture warping and panorama creation Compute 3D reconstructions from several images of the same scene Organize images based on similarity or content using clustering methods Build efficient image retrieval techniques to search for images based on visual content Use algorithms to classify image content and recognize objects Access the popular OpenCV library through a Python interface **OpenCV with Python By Example** Prateek Joshi,2015-09-22 Build real world computer vision applications and develop cool demos using OpenCV for Python About This Book Learn how to apply complex visual effects to images using geometric transformations and image filters Extract features from an image and use them to develop advanced applications Build algorithms to help you understand the image content and perform visual searches Who This Book Is For This book is intended for Python developers who are new to OpenCV and want to develop computer vision applications with OpenCV Python This book is also useful for generic software developers who want to deploy computer vision applications on the cloud It would be helpful to have some familiarity with basic mathematical concepts such as vectors matrices and so on What You Will Learn Apply geometric transformations to images perform image filtering and convert an image into a cartoon like image Detect and track various body parts such as the face nose eyes ears and mouth Stitch multiple images of a scene together to

create a panoramic image Make an object disappear from an image Identify different shapes segment an image and track an object in a live video Recognize an object in an image and build a visual search engine Reconstruct a 3D map from images Build an augmented reality application In Detail Computer vision is found everywhere in modern technology OpenCV for Python enables us to run computer vision algorithms in real time With the advent of powerful machines we are getting more processing power to work with Using this technology we can seamlessly integrate our computer vision applications into the cloud Web developers can develop complex applications without having to reinvent the wheel This book will walk you through all the building blocks needed to build amazing computer vision applications with ease We start off with applying geometric transformations to images We then discuss affine and projective transformations and see how we can use them to apply cool geometric effects to photos We will then cover techniques used for object recognition 3D reconstruction stereo imaging and other computer vision applications This book will also provide clear examples written in Python to build OpenCV applications The book starts off with simple beginner s level tasks such as basic processing and handling images image mapping and detecting images It also covers popular OpenCV libraries with the help of examples The book is a practical tutorial that covers various examples at different levels teaching you about the different functions of OpenCV and their actual implementation Style and approach This is a conversational style book filled with hands on examples that are really easy to understand Each topic is explained very clearly and is followed by a programmatic implementation so that the concept is solidified Each topic contributes to something bigger in the following chapters which helps you understand how to piece things together to build something big and complex *Learning OpenCV 3 Computer Vision with Python* Joe Minichino,2015 Unleash the power of computer vision with Python using OpenCVAbout 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 guideWho This Book Is ForIntended 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 applicationIn DetailOpenCV 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 approachThis 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 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 **Artificial Intelligence Programming with Python** Perry Xiao,2022-02-21 A hands on roadmap to using Python for artificial intelligence programming In Practical Artificial Intelligence Programming with Python From Zero to Hero veteran educator and photophysicist Dr Perry Xiao delivers a thorough introduction to one of the most exciting areas of computer science in modern history The book demystifies artificial intelligence and teaches readers its fundamentals from scratch in simple and plain language and with illustrative code examples Divided into three parts the author explains artificial intelligence generally machine learning and deep learning It tackles a wide variety of useful topics from classification and regression in machine learning to generative adversarial networks He also includes Fulsome introductions to MATLAB Python AI machine learning and deep learning Expansive discussions on supervised and unsupervised machine learning as well as semi supervised learning Practical AI and Python cheat sheet quick references This hands on AI programming guide is perfect for anyone with a basic knowledge of programming including familiarity with variables arrays loops if else statements and file input and output who seeks to understand foundational concepts in AI and AI development 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 FeaturesImplement image classification and object detection using machine learning and deep learningPerform image classification object detection image segmentation and other Computer Vision tasksCrisp content with a practical approach to solving real world problems in Computer VisionBook Description Python is the ideal programming language for rapidly prototyping and developing production grade codes for image processing and Computer Vision with its robust syntax and wealth of powerful libraries This book will help you design and develop production grade Computer Vision projects tackling real world problems With the help of this book you will learn how to set up Anaconda and Python for the major OSes with cutting edge third party libraries for Computer Vision You ll learn state of the art techniques for classifying images finding and identifying human postures and detecting faces within videos You will use powerful machine learning tools such as OpenCV Dlib and TensorFlow to build exciting projects such as classifying handwritten digits detecting facial features and much more The book also covers some advanced projects such as reading text from license plates from real world images using Google s Tesseract software and tracking human body poses using DeeperCut within TensorFlow By the end of this book you will have the expertise required to build your own Computer Vision projects using Python and its associated libraries What you will learnInstall and run major Computer Vision packages within PythonApply powerful support vector machines for simple digit classificationUnderstand deep learning with TensorFlowBuild a deep learning classifier for general imagesUse LSTMs for automated image captioningRead text from real world imagesExtract human pose data from imagesWho this book is for Python programmers and machine learning developers who

wish to build exciting Computer Vision projects using the power of machine learning and OpenCV will find this book useful The only prerequisite for this book is that you should have a sound knowledge of Python programming *OpenCV Computer Vision with Python* Joseph Howse,2015-01-07 Learn to capture videos manipulate images and track objects with Python using the OpenCV Library Overview Set up OpenCV its Python bindings and optional Kinect drivers on Windows Mac or Ubuntu Create an application that tracks and manipulates faces Identify face regions using normal color images and depth images In Detail Computer Vision can reach consumers in various contexts via webcams camera phones and gaming sensors like Kinect OpenCV s Python bindings can help developers meet these consumer demands for applications that capture images change their appearance and extract information from them in a high level language and in a standardized data format that is interoperable with scientific libraries such as NumPy and SciPy OpenCV Computer Vision with Python is a practical hands on guide that covers the fundamental tasks of computer vision capturing filtering and analyzing images with step by step instructions for writing both an application and reusable library classes OpenCV Computer Vision with Python shows you how to use the Python bindings for OpenCV By following clear and concise examples you will develop a computer vision application that tracks faces in live video and applies special effects to them If you have always wanted to learn which version of these bindings to use how to integrate with cross platform Kinect drivers and and how to efficiently process image data with NumPy and SciPy then this book is for you What you will learn from this book Install OpenCV and related software such as Python NumPy SciPy OpenNI and SensorKinect all on Windows Mac or Ubuntu Capture display and save photos and real time videos Handle window events and input events using OpenCV s HighGui module or Pygame Understand OpenCV s image format and how to perform efficient operations on OpenCV images with NumPy and SciPy Apply curves and other color transformations to simulate the look of old photos movies or video games Apply an effect only to edges in an image Copy and resize segments of an image Apply an effect only to certain depths in an image by using data from a depth sensor such as Kinect Track faces eyes noses and mouths by using prebuilt datasets Track arbitrary objects by creating original datasets Approach A practical project based tutorial for Python developers and hobbyists who want to get started with computer vision with OpenCV and Python Who this book is written for OpenCV Computer Vision with Python is written for Python developers who are new to computer vision and want a practical guide to teach them the essentials Some understanding of image data for example pixels and color channels would be beneficial At a minimum you will need access to at least one webcam Certain exercises require additional hardware like a second webcam a Microsoft Kinect or an OpenNI compliant depth sensor such as the Asus Xtion PRO Hands-on ML Projects with OpenCV: Master Computer Vision and Machine Learning using OpenCV and Python Mugesh S.,2023-08-09 Be at your A game in building Intelligent systems by leveraging Computer vision and Machine Learning Key Features Step by step instructions and code snippets for real world ML projects Covers entire spectrum from basics to advanced concepts such as deep learning transfer learning and model

optimization Loaded with practical tips and best practices for implementing machine learning with OpenCV for optimising your workflow Book Description This book is an in depth guide that merges machine learning techniques with OpenCV the most popular computer vision library using Python The book introduces fundamental concepts in machine learning and computer vision progressing to practical implementation with OpenCV Concepts related to image preprocessing contour and thresholding techniques motion detection and tracking are explained in a step by step manner using code and output snippets Hands on projects with real world datasets will offer you an invaluable experience in solving OpenCV challenges with machine learning It s an ultimate guide to explore areas like deep learning transfer learning and model optimization empowering readers to tackle complex tasks Every chapter offers practical tips and tricks to build effective ML models By the end you would have mastered and applied ML concepts confidently to real world computer vision problems and will be able to develop robust and accurate machine learning models for diverse applications Whether you are new to machine learning or seeking to enhance your computer vision skills This book is an invaluable resource for mastering the integration of machine learning and computer vision using OpenCV and Python What you will learn Learn how to work with images and perform basic image processing tasks using OpenCV Implement machine learning techniques to computer vision tasks such as image classification object detection and image segmentation Work on real world projects and datasets to gain hands on experience in applying machine learning techniques with OpenCV Explore the concepts of deep learning using Tensorflow and Keras and how it can be used for computer vision tasks Who is this book for This book is for everyone with a basic understanding of programming and who wants to apply machine learning in computer vision using OpenCV and Python Whether you re a student researcher or developer this book will equip you with practical skills for machine learning projects Some familiarity with Python and machine learning concepts is assumed Table of ContentsChapter 1 Getting Started With OpenCV Chapter 2 Basic Image Video Analytics in OpenCV Chapter 3 Image Processing 1 using OpenCV Chapter 4 Image Processing 2 using OpenCV Chapter 5 Thresholding and Contour Techniques Using OpenCV Chapter 6 Detect Corners and Road Lane using OpenCV Chapter 7 Object And Motion Detection Using Opencv Chapter 8 Image Segmentation and Detecting Faces Using OpenCV Chapter 9 Introduction to Deep Learning with OpenCV Chapter 10 Advance Deep Learning Projects with OpenCV Chapter 11 Deployment of OpenCV projects **OpenCV with Python** Panchanand Jha,2020-09-16 Image processing is a technique to analyses and extract valuable information from an image using computer vision algorithms Mathematically an image is nothing but two dimensional matrix and function of two coordinate x and y The x and y coordinates gives location of pixel and it value This value of pixel defines the brightness or color of an image at that location On the other hand image can also have three dimensional vector such as Red Green and Blue RGB Therefore it is quite important to have mathematical description of an image to develop further image processing algorithms These algorithms have wide range of applications such as image stitching morphing object detections recognition color filtering etc

Present scenario of computer vision or digital imaging has been widely adopted in various places such as security camera robotics vision movies special effects and counting The extreme use of image or video processing or one can say the major application of the image video processing algorithms is to generate special effects on movies In daily life we can find wide net of computer vision and it is keep on expanding On the other hand automobiles aircrafts drones ships and trains are equipped with computer vision Automobiles using computer vision for rear parking assistance drones for surveillances and so on Now a day s major use of computer vision can also be found in social network sites such as Facebook Google YouTube Lens kart etc in these sites image video processing with facial recognition algorithm is being used If someone upload a video on YouTube then it has to pass through video processing algorithm for various reasons Therefore OpenCv plays a crucial role here for processing these images and videos In OpenCV library multiple algorithms and function are available to perform certain task for example any image can be resized cropped format pasting or overlapping of two images rotating flipping drawing color transformations etc can be done with simple line of code In further chapter the details of these codes are explained OpenCV is capable of optimizing memory handlings error handlings multi threading and re enterability These properties of OpenCV makes it computationally efficient and best for real time practical implementations More details of OpenCV can be found in the OpenCV official website as this project is focused on image video processing **Intelligent Video Surveillance** Antonio Neves,2019 The goal of Intelligent video surveillance systems is to efficiently extract useful information from a considerable number of videos collected by surveillance cameras by automatically detecting tracking and recognizing objects of interest and understanding and analyzing their activities Video surveillance has a huge amount of applications from public to private places These applications require monitoring indoor and outdoor scenes Nowadays there are a considerable number of digital surveillance cameras collecting a huge amount of data on a daily basis Researchers are urged to develop intelligent systems to efficiently extract and visualize useful information from this big data source The exponential effort on the development of new algorithms and systems for video surveillance is confirmed by the amount of effort invested in projects and companies the creation on new startups worldwide and not less important in the quantity and quality of the manuscripts published in a considerable number of journals and conferences worldwide This book is an outcome of research done by several researchers who have highly contributed to the field of Video Surveillance The main goal is to present recent advances in this important topic for the Image Processing community *Learning OpenCV 4 Computer Vision with Python* 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.x with Python By Example - Second Edition** Gabriel Garrido,Prateek Joshi,2018 Learn the techniques for object recognition 3D reconstruction stereo imaging and other computer vision applications using examples on different functions of OpenCV About This Book Learn how to apply complex visual effects to images with OpenCV 3 x and Python Extract features from an image and use them to develop advanced applications Build algorithms to help you understand image content and perform visual searches Get to grips with advanced techniques in OpenCV such as machine learning artificial neural network 3D reconstruction and augmented reality Who This Book Is For This book is intended for Python developers who are new to OpenCV and want to develop computer vision applications with OpenCV and Python This book is also useful for generic software developers who want to deploy computer vision applications on the cloud It would be helpful to have some familiarity with basic mathematical concepts such as vectors matrices and so on What You Will Learn Detect shapes and edges from images and videos How to apply filters on images and videos Use different techniques to manipulate and improve

images Extract and manipulate particular parts of images and videos Track objects or colors from videos Recognize specific object or faces from images and videos How to create Augmented Reality applications Apply artificial neural networks and machine learning to improve object recognition In Detail Computer vision is found everywhere in modern technology OpenCV for Python enables us to run computer vision algorithms in real time With the advent of powerful machines we have more processing power to work with Using this technology we can seamlessly integrate our computer vision applications into the cloud Focusing on OpenCV 3 x and Python 3 6 this book will walk you through all the building blocks needed to build amazing computer vision applications with ease We start off by manipulating images using simple filtering and geometric transformations We then discuss affine and projective transformations and see how we can use them to apply cool advanced manipulations to your photos like resizing them while keeping the content intact or smoothly removing undesired elements We will then cover techniques of object tracking body part recognition and object recognition using advanced techniques of machine learning such as artificial neural network 3D reconstruction and augmented reality techniques are also included The book covers popular Ope **OpenCV with Python Blueprints** Michael Beyeler,2015-10-19 Design and develop advanced computer vision projects using OpenCV with Python About This Book Program advanced computer vision applications in Python using different features of the OpenCV library Practical end to end project covering an important computer vision problem All projects in the book include a step by step guide to create computer vision applications Who This Book Is For This book is for intermediate users of OpenCV who aim to master their skills by developing advanced practical applications Readers are expected to be familiar with OpenCV s concepts and Python libraries Basic knowledge of Python programming is expected and assumed What You Will Learn Generate real time visual effects using different filters and image manipulation techniques such as dodging and burning Recognize hand gestures in real time and perform hand shape analysis based on the output of a Microsoft Kinect sensor Learn feature extraction and feature matching for tracking arbitrary objects of interest Reconstruct a 3D real world scene from 2D camera motion and common camera reprojection techniques Track visually salient objects by searching for and focusing on important regions of an image Detect faces using a cascade classifier and recognize emotional expressions in human faces using multi layer peceptrons MLPs Recognize street signs using a multi class adaptation of support vector machines SVMs Strengthen your OpenCV2 skills and learn how to use new OpenCV3 features In Detail OpenCV is a native cross platform C Library for computer vision machine learning and image processing It is increasingly being adopted in Python for development OpenCV has C C Python and Java interfaces with support for Windows Linux Mac iOS and Android Developers using OpenCV build applications to process visual data this can include live streaming data from a device like a camera such as photographs or videos OpenCV offers extensive libraries with over 500 functions This book demonstrates how to develop a series of intermediate to advanced projects using OpenCV and Python rather than teaching the core concepts of OpenCV in theoretical lessons Instead the working projects developed in this book

teach the reader how to apply their theoretical knowledge to topics such as image manipulation augmented reality object tracking 3D scene reconstruction statistical learning and object categorization By the end of this book readers will be OpenCV experts whose newly gained experience allows them to develop their own advanced computer vision applications Style and approach This book covers independent hands on projects that teach important computer vision concepts like image processing and machine learning for OpenCV with multiple examples OpenCV 3.x with Python by Example: Make the Most of OpenCV and Python to Build Applications for Object Recognition and Augmented Reality Gabriel Garrido,2018

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