Practical Python and OpenCV

An Introductory, Example Driven Guide to
Image Processing and Computer Vision

3RD EDITION

Dr. Adrian Rosebrock

PyImageSearch

Practical Python And Opencv By Adrian Rosebrock

Mark Stamp,Mamoun Alazab,Andrii Shalaginov

Practical Python And Opencv By Adrian Rosebrock:

Practical Python and OpenCV + Case Studies Adrian Rosebrock,2015   *Practical Python and OpenCV + Case Studies* Adrian Rosebrook,2016   **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   **Learning OpenCV 4 Computer Vision with Python 3** Joseph Howse,Joe Minichino,2020-02-20 Updated for OpenCV 4 and Python 3 this book covers the latest on depth cameras 3D tracking augmented reality and deep neural networks helping you solve real world computer vision problems with practical code Key Features Build powerful computer vision applications in concise code with OpenCV 4 and Python 3 Learn the fundamental concepts of image processing object classification and 2D and 3D tracking Train use and understand machine learning models such as Support Vector Machines SVMs and neural networks Book

Description Computer vision is a rapidly evolving science encompassing diverse applications and techniques This book will not only help those who are getting started with computer vision but also experts in the domain You ll be able to put theory into practice by building apps with OpenCV 4 and Python 3 You ll start by understanding OpenCV 4 and how to set it up with Python 3 on various platforms Next you ll learn how to perform basic operations such as reading writing manipulating and displaying still images videos and camera feeds From taking you through image processing video analysis and depth estimation and segmentation to helping you gain practice by building a GUI app this book ensures you ll have opportunities for hands on activities Next you ll tackle two popular challenges face detection and face recognition You ll also learn about object classification and machine learning concepts which will enable you to create and use object detectors and classifiers and even track objects in movies or video camera feed Later you ll develop your skills in 3D tracking and augmented reality Finally you ll cover ANNs and DNNs learning how to develop apps for recognizing handwritten digits and classifying a person s gender and age By the end of this book you ll have the skills you need to execute real world computer vision projects What you will learn Install and familiarize yourself with OpenCV 4 s Python 3 bindings Understand image processing and video analysis basics Use a depth camera to distinguish foreground and background regions Detect and identify objects and track their motion in videos Train and use your own models to match images and classify objects Detect and recognize faces and classify their gender and age Build an augmented reality application to track an image in 3D Work with machine learning models including SVMs artificial neural networks ANNs and deep neural networks DNNs Who this book is for If you are interested in learning computer vision machine learning and OpenCV in the context of practical real world applications then this book is for you This OpenCV book will also be useful for anyone getting started with computer vision as well as experts who want to stay up to date with OpenCV 4 and Python 3 Although no prior knowledge of image processing computer vision or machine learning is required familiarity with basic Python programming is a must **Real-World Python** Lee Vaughan,2020-11-10 A project based approach to learning Python programming for beginners Intriguing projects teach you how to tackle challenging problems with code You ve mastered the basics Now you re ready to explore some of Python s more powerful tools Real World Python will show you how Through a series of hands on projects you ll investigate and solve real world problems using sophisticated computer vision machine learning data analysis and language processing tools You ll be introduced to important modules like OpenCV NumPy Pandas NLTK Bokeh Beautiful Soup Requests HoloViews Tkinter turtle matplotlib and more You ll create complete working programs and think through intriguing projects that show you how to Save shipwrecked sailors with an algorithm designed to prove the existence of God Detect asteroids and comets moving against a starfield Program a sentry gun to shoot your enemies and spare your friends Select landing sites for a Mars probe using real NASA maps Send unbreakable messages based on a book code Survive a zombie outbreak using data science Discover exoplanets and alien megastructures orbiting distant stars Test the hypothesis that we re all living in a computer

simulation And more If you re tired of learning the bare essentials of Python Programming with isolated snippets of code you ll relish the relevant and geeky fun of Real World Python   **Malware Analysis Using Artificial Intelligence and Deep Learning** Mark Stamp,Mamoun Alazab,Andrii Shalaginov,2020-12-20 This book is focused on the use of deep learning DL and artificial intelligence AI as tools to advance the fields of malware detection and analysis The individual chapters of the book deal with a wide variety of state of the art AI and DL techniques which are applied to a number of challenging malware related problems DL and AI based approaches to malware detection and analysis are largely data driven and hence minimal expert domain knowledge of malware is needed This book fills a gap between the emerging fields of DL AI and malware analysis It covers a broad range of modern and practical DL and AI techniques including frameworks and development tools enabling the audience to innovate with cutting edge research advancements in a multitude of malware and closely related use cases   **Mastering OpenCV 4 with Python** Alberto Fernández Villán,2019-03-29 Create advanced applications with Python and OpenCV exploring the potential of facial recognition machine learning deep learning web computing and augmented reality Key FeaturesDevelop your computer vision skills by mastering algorithms in Open Source Computer Vision 4 OpenCV 4 and PythonApply machine learning and deep learning techniques with TensorFlow and KerasDiscover the modern design patterns you should avoid when developing efficient computer vision applicationsBook 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 learnHandle files and images and explore various image processing techniquesExplore image transformations including translation resizing and croppingGain insights into building histogramsBrush up on contour detection filtering and drawingWork with Augmented Reality to build marker based and markerless applicationsWork with the main machine learning algorithms in OpenCVExplore the deep learning Python libraries and OpenCV deep learning capabilitiesCreate computer vision and deep

learning web applicationsWho 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 *Sustainable Smart Cities* Pradeep Kumar Singh,Marcin Paprzycki,Mohamad Essaaidi,Shahram Rahimi,2022-11-02 This book brings the recent collection of smart technologies Smart cities challenges and key requirements are discussed through the technological solutions IoT cloud computing block chain and artificial intelligence Firstly the key technologies contributing to the smart cities research are identified Then the most popular ones are covered in context to their theoretical and practical applications Smart cities technologies are one of the recent research areas Every day new technological solutions are coming to make smart cities more sustainable The book explores the integration of main key technologies for smart cities which are IoT cloud computing data science AI and block chain Industry 4 0 Moreover some integrated solutions using AI data science and IoT will attract the attention of end users Primary market of the book is aimed toward the undergraduate and master students IoT cloud computing artificial intelligence and block chain are elective courses at the bachelor level in the engineering domain and its application areas in context to smart cities are covered in this book The book is a good source of reference for their master dissertations Ph D students or scholars who are working on these key technologies like IoT cloud AI data science block chain Industry 4 0 will find this book as a constant source of reference for their ongoing research Smart city planners architects and municipal experts may also find this book useful

Mastering OpenCV with Python: Use NumPy, Scikit, TensorFlow, and Matplotlib to learn Advanced algorithms for Machine Learning through a set of Practical Projects Ayush Vaishya,2023-11-16 Unlocking Visual Insights OpenCV Made Simple and Powerful Key Features OpenCV Mastery Harness the full potential of OpenCV Comprehensive Coverage From fundamentals to advanced techniques Practical Exercises Apply knowledge through hands on tasks Book Description Mastering OpenCV with Python immerses you in the captivating realm of computer vision with a structured approach that equips you with the knowledge and skills essential for success in this rapidly evolving field From grasping the fundamental concepts of image processing and OpenCV to mastering advanced techniques such as neural networks and object detection you will gain a comprehensive understanding Each chapter is enriched with hands on exercises and real world projects ensuring the acquisition of practical skills that can be immediately applied in your professional journey This book not only elevates your technical proficiency but also prepares you for a rewarding career The technological job landscape is constantly evolving and professionals who can harness the potential of computer vision are in high demand By mastering the skills and insights contained within these pages you will be well prepared to explore exciting career opportunities ranging from machine learning engineering to computer vision research This book is your ticket to a future filled with innovation and professional advancement within the dynamic world of computer vision What you will learn Master Image Processing and Machine Learning with OpenCV using advanced Tools and Libraries Create Real World Projects with Hands On Experience

Explore Machine Learning for Computer Vision Develop Confidence in Practical Computer Vision Projects Conquer Real World Image Processing Challenges Apply Computer Vision Across Diverse Industries Boost Your Career in Computer Vision Become an Expert in Computer Vision for Career Advancement Who is this book for This beginner friendly book in computer vision requires no prior experience making it accessible to newcomers While a basic programming understanding is helpful it s designed to guide individuals from diverse backgrounds into the captivating realms of AI computer vision and image processing It s equally valuable for aspiring tech professionals students and enthusiasts seeking rewarding careers and knowledge in these cutting edge fields Table of Contents 1 Introduction to Computer Vision 2 Getting Started with Images 3 Image Processing Fundamentals 4 Image Operations 5 Image Histograms 6 Image Segmentation 7 Edges and Contours 8 Machine Learning with Images 9 Advanced Computer Vision Algorithms 10 Neural Networks 11 Object Detection Using OpenCV 12 Projects Using OpenCV Index **Mastering OpenCV with Python** Ayush Vaishya,2023-11-15 Unlocking Visual Insights OpenCV Made Simple and Powerful KEY FEATURES OpenCV Mastery Harness the full potential of OpenCV Comprehensive Coverage From fundamentals to advanced techniques Practical Exercises Apply knowledge through hands on tasks DESCRIPTION Mastering OpenCV with Python immerses you in the captivating realm of computer vision with a structured approach that equips you with the knowledge and skills essential for success in this rapidly evolving field From grasping the fundamental concepts of image processing and OpenCV to mastering advanced techniques such as neural networks and object detection you will gain a comprehensive understanding Each chapter is enriched with hands on exercises and real world projects ensuring the acquisition of practical skills that can be immediately applied in your professional journey This book not only elevates your technical proficiency but also prepares you for a rewarding career The technological job landscape is constantly evolving and professionals who can harness the potential of computer vision are in high demand By mastering the skills and insights contained within these pages you will be well prepared to explore exciting career opportunities ranging from machine learning engineering to computer vision research This book is your ticket to a future filled with innovation and professional advancement within the dynamic world of computer vision WHAT WILL YOU LEARN Master Image Processing and Machine Learning with OpenCV using advanced Tools and Libraries Create Real World Projects with Hands On Experience Explore Machine Learning for Computer Vision Develop Confidence in Practical Computer Vision Projects Conquer Real World Image Processing Challenges Apply Computer Vision Across Diverse Industries Boost Your Career in Computer Vision Become an Expert in Computer Vision for Career Advancement WHO IS THIS BOOK FOR This beginner friendly book in computer vision requires no prior experience making it accessible to newcomers While a basic programming understanding is helpful it s designed to guide individuals from diverse backgrounds into the captivating realms of AI computer vision and image processing It s equally valuable for aspiring tech professionals students and enthusiasts seeking rewarding careers and knowledge in these cutting edge fields TABLE OF CONTENTS 1

Introduction to Computer Vision 2 Getting Started with Images 3 Image Processing Fundamentals 4 Image Operations 5 Image Histograms 6 Image Segmentation 7 Edges and Contours 8 Machine Learning with Images 9 Advanced Computer Vision Algorithms 10 Neural Networks 11 Object Detection Using OpenCV 12 Projects Using OpenCV Index   *OpenCV 3 Computer Vision with Python Cookbook* Alexey Spizhevoy,Aleksandr Rybnikov,2018-03-21 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

   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

OpenCV Computer Vision with Python Joseph Howse,2013 A practical project based tutorial for Python developers and hobbyists who want to get started with computer vision with OpenCV and Python 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 **OpenCV with Python Blueprints** Michael Beyeler,2015 Design and develop advanced computer vision projects using OpenCV with PythonAbout 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 applicationsWho This Book Is ForThis 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 featuresIn DetailOpenCV 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 functionsThis 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 approachThis book covers independent hands on projects that teach important computer vision concepts like image processing and machine learning for OpenCV with multiple examples   **OpenCV 4 with Python Blueprints** Dr. Menua Gevorgyan,Arsen Mamikonyan,Michael Beyeler,2020-03-20 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 FeaturesUnderstand how to capture high quality image data detect and track objects and process the actions of animals or humansImplement your learning in different areas of computer visionExplore advanced concepts in OpenCV such as machine learning artificial neural network and augmented realityBook 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 learnGenerate real time visual effects using filters and image manipulation techniques such as dodging and burningRecognize hand gestures in real time and perform hand shape analysis based on the output of a Microsoft Kinect sensorLearn feature extraction and feature matching to track arbitrary objects of interestReconstruct a 3D real world scene using 2D camera motion and camera reprojection techniquesDetect faces using a cascade classifier and identify emotions in human faces using multilayer perceptronsClassify localize and detect objects with deep neural networksWho this book is for This book is for intermediate level OpenCV users who are looking to enhance their skills by developing advanced applications Familiarity with OpenCV concepts and Python libraries and basic knowledge of the Python programming language are assumed   **OpenCV 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   *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   **Practical Python Projects** BOOKER. BLUNT,Boozman Richard,2025-04-19 Turn your coding curiosity into confidence by learning how to bring real solutions to life one project at a time This book is your gateway to building modern tech skills through actual development scenarios that mimic real tasks in the tech world Designed for self learners students and aspiring engineers it teaches the foundations of software creation while guiding you through functional results driven exercises Whether you re designing tools for automation working on backend logic or enhancing user experiences this book will walk you through it all using an engaging beginner friendly approach Inside you ll discover How to break down complex problems into manageable code The secrets to writing clean efficient scripts with reusable components Key concepts like functions conditionals loops and error handling Interactive exercises that mirror real business or tech challenges Techniques to improve your logic workflow and problem solving skills Tips to organize document and maintain your digital solutions No fluff No theory overload Just focused lessons that help you write code that works today Ideal for learners who want to build functional systems explore real tech challenges and walk away with practical results

Practical Python Programming David Beazley,2018 **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

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