



Community Experience Distilled

# Mastering OpenCV with Practical Computer Vision Projects

Step-by-step tutorials to solve common real-world computer vision problems for desktop or mobile, from augmented reality and number plate recognition to face recognition and 3D head tracking

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# Mastering Opencv With Practical Computer Vision Projects

**RS Peters**



## **Mastering Opencv With Practical Computer Vision Projects:**

**Mastering OpenCV with Practical Computer Vision Projects** Daniel Lélis Baggio,2012-12-03 Each chapter in the book is an individual project and each project is constructed with step by step instructions clearly explained code and includes the necessary screenshots You should have basic OpenCV and C C programming experience before reading this book as it is aimed at Computer Science graduates researchers and computer vision experts widening their expertise

**Mastering OpenCV with Practical Computer Vision Projects** Daniel Lélis Baggio,2012 This is the definitive advanced tutorial for OpenCV designed for those with basic C skills The computer vision projects are divided into easily assimilated chapters with an emphasis on practical involvement for an easier learning curve Cool fun and advanced projects that cover the various aspects of OpenCV programming Strong emphasis on programming techniques and methodology for the best approach to each project Ten projects that are carefully designed to build on your skills at every step In Detail OpenCV is a computer vision library that is extensively used in companies research groups and governmental bodies for real time capture video file import image manipulation object detection and much more Its comprehensive set of computer vision and machine learning algorithms makes it the obvious choice for professionals to develop visual applications With this book in hand you would not need to plow through several pages of theory as this book will take you through the creation of many exciting projects that showcase the huge range of possibilities that open up when OpenCV is exploited to its full potential

*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 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 FeaturesLearn about the new features that help unlock the full potential of OpenCV 4Build face detection applications with a cascade classifier using face landmarksCreate an optical character recognition OCR model using deep learning and convolutional neural networksBook 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 OpenCV4 What you will learnBuild real world computer vision problems with working OpenCV code samplesUncover best practices in engineering and maintaining OpenCV projectsExplore algorithmic design approaches for complex computer vision tasksWork with OpenCV s most updated API v4 0 0 through projectsUnderstand 3D scene reconstruction and Structure from Motion SfM Study camera calibration and overlay AR using the ArUco ModuleWho 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

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 by Example](#) Prateek Joshi,David Millan Escriva,2016-01-22 Enhance your understanding of Computer Vision and image processing by developing real world projects in OpenCV 3About This Book Get to grips with the basics of Computer Vision and image processing This is a step by step guide to developing several real world Computer Vision projects using OpenCV 3 This book takes a special focus on working with Tesseract OCR a free open source library to recognize text in imagesWho This Book Is ForIf you are a software developer with a basic understanding of Computer Vision and image processing and want to develop interesting Computer Vision applications with Open CV this is the book for you Knowledge of C is required What You Will Learn Install OpenCV 3 on your operating system Create the required CMake scripts to compile the C application and manage its dependencies Get to grips with the Computer Vision workflows and understand the basic image matrix format and filters Understand the segmentation and feature extraction techniques Remove backgrounds from a static scene to identify moving objects for video surveillance Track different objects in a live video using various techniques Use the new OpenCV functions for text detection and recognition with TesseractIn DetailOpen CV is a cross platform free for use library that is primarily used for real time Computer Vision and image processing It is considered to be one of the best open source libraries that helps developers

focus on constructing complete projects on image processing motion detection and image segmentation Whether you are completely new to the concept of Computer Vision or have a basic understanding of it this book will be your guide to understanding the basic OpenCV concepts and algorithms through amazing real world examples and projects Starting from the installation of OpenCV on your system and understanding the basics of image processing we swiftly move on to creating optical flow video analysis or text recognition in complex scenes and will take you through the commonly used Computer Vision techniques to build your own Open CV projects from scratch By the end of this book you will be familiar with the basics of Open CV such as matrix operations filters and histograms as well as more advanced concepts such as segmentation machine learning complex video analysis and text recognition

**Style and approach** This book is a practical guide with lots of tips and is closely focused on developing Computer vision applications with OpenCV Beginning with the fundamentals the complexity increases with each chapter Sample applications are developed throughout the book that you can execute and use in your own projects

**Computer Vision for the Web** Foat Akhmadeev, 2015-10-14 Unleash the power of the Computer Vision algorithms in JavaScript to develop vision enabled web content About This Book Explore the exciting world of image processing and face and gesture recognition and implement them in your website Develop wonderful web projects to implement Computer Vision algorithms in an effective way A fast paced guide to help you deal with real world Computer Vision applications using JavaScript libraries Who This Book Is For If you have an interest in Computer Vision or wish to apply Computer Vision algorithms such as face custom object and gesture recognition for an online application then this book is ideal for you Prior understanding of the JavaScript language and core mathematical concepts is recommended What You Will Learn Apply complex Computer Vision algorithms in your applications using JavaScript Put together different JavaScript libraries to discover objects in photos Get to grips with developing simple computer vision applications on your own Understand when and why you should use different computer vision methods Apply various image filters to images and videos Recognize and track many different objects including face and face particles using powerful face recognition algorithms Explore ways to control your browser without touching the mouse or keyboard In Detail JavaScript is a dynamic and prototype based programming language supported by every browser today JavaScript libraries boast outstanding functionalities that enable you to furnish your own Computer Vision projects making it easier to develop JavaScript based applications especially for web centric technologies It makes the implementation of Computer Vision algorithms easier as it supports scheme based functional programming This book will give you an insight into controlling your applications with gestures and head motion and readying them for the web Packed with real world tasks it begins with a walkthrough of the basic concepts of Computer Vision that the JavaScript world offers us and you ll implement various powerful algorithms in your own online application Then we move on to a comprehensive analysis of JavaScript functions and their applications Furthermore the book will show you how to implement filters and image segmentation and use tracking.js and jsfeat libraries

to convert your browser into Photoshop Subjects such as object and custom detection feature extraction and object matching are covered to help you find an object in a photo You will see how a complex object such as a face can be recognized by a browser as you move toward the end of the book Finally you will focus on algorithms to create a human interface By the end of this book you will be familiarized with the application of complex Computer Vision algorithms to develop your own applications without spending much time learning sophisticated theory Style and approach This book is an easy to follow project based guide that throws you directly into the excitement of the Computer Vision theme A more in less approach is followed by important concepts explained in a to the point easy to understand manner *OpenCV for Secret Agents* Joseph Howse, 2015-01-28 This book is for programmers who want to expand their skills by building fun smart and useful systems with OpenCV The projects are ideal in helping you to think creatively about the uses of computer vision natural user interfaces and ubiquitous computers in your home car and hand

**OpenCV: Computer Vision Projects with Python** Joseph Howse, Prateek Joshi, Michael Beyeler, 2016-10-24 Get savvy with OpenCV and actualize cool computer vision applications About This Book Use OpenCV's Python bindings to capture video manipulate images and track objects Learn about the different functions of OpenCV and their actual implementations Develop a series of intermediate to advanced projects using OpenCV and Python Who This Book Is For This learning path is for someone who has a working knowledge of Python and wants to try out OpenCV This Learning Path will take you from a beginner to an expert in computer vision applications using OpenCV OpenCV's application are humongous and this Learning Path is the best resource to get yourself acquainted thoroughly with OpenCV What You Will Learn Install OpenCV and related software such as Python NumPy SciPy OpenNI and SensorKinect all on Windows Mac or Ubuntu Apply curves and other color transformations to simulate the look of old photos movies or video games Apply geometric transformations to images perform image filtering and convert an image into a cartoon like image Recognize hand gestures in real time and perform hand shape analysis based on the output of a Microsoft Kinect sensor Reconstruct a 3D real world scene from 2D camera motion and common camera reprojection techniques Detect and recognize street signs using a cascade classifier and support vector machines SVMs Identify emotional expressions in human faces using convolutional neural networks CNNs and SVMs Strengthen your OpenCV2 skills and learn how to use new OpenCV3 features In Detail OpenCV is a state of art computer vision library that allows a great variety of image and video processing operations OpenCV for Python enables us to run computer vision algorithms in real time This learning path proposes to teach the following topics First we will learn how to get started with OpenCV and OpenCV3's Python API and develop a computer vision application that tracks body parts Then we will build amazing intermediate level computer vision applications such as making an object disappear from an image identifying different shapes reconstructing a 3D map from images and building an augmented reality application Finally we'll move to more advanced projects such as hand gesture recognition tracking visually salient objects as well as recognizing traffic signs and emotions on faces using

support vector machines and multi layer perceptrons respectively This Learning Path combines some of the best that Packt has to offer in one complete curated package It includes content from the following Packt products OpenCV Computer Vision with Python by Joseph Howse OpenCV with Python By Example by Prateek Joshi OpenCV with Python Blueprints by Michael Beyeler Style and approach This course aims to create a smooth learning path that will teach you how to get started with will learn how to get started with OpenCV and OpenCV 3 s Python API and develop superb computer vision applications Through this comprehensive course you ll learn to create computer vision applications from scratch to finish and more

*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

**OpenCV 3.0 Computer Vision with Java** Daniel Lélis Baggio, 2015-07-30 OpenCV 3 0 Computer Vision with Java is a practical tutorial guide that explains fundamental tasks from computer vision while focusing on Java development This book will teach you how to set up OpenCV for Java and handle matrices using the basic operations of image processing such as filtering and image transforms It will also help you learn how to use Haar cascades for tracking faces and to detect foreground and background regions with the help of a Kinect device It will even give you insights into server side OpenCV Each chapter is presented with several projects



that are ready to use The functionality of these projects is found in many classes that allow developers to understand computer vision principles and rapidly extend or customize the projects for their needs

**Image Processing with ImageJ** Jurjen Broeke, Jose Maria Mateos Perez, Javier Pascau, 2015-11-30 Extract and analyze data from complex images with ImageJ the world's leading image processing tool About This Book Design automated image processing solutions and speed up image processing tasks with ImageJ Create quality and intuitive interfaces for image processing by developing a basic framework for ImageJ plugins Tackle even the most sophisticated datasets and complex images Who This Book Is For The book has been created for engineers scientists and developers eager to tackle image processing with one of the leading tools available No prior knowledge of ImageJ is needed Familiarity with Java programming will be required for readers to code their own routines using ImageJ What You Will Learn Install and set up ImageJ for image processing Process images using ImageJ's built-in tools Create macros to perform repetitive processing tasks Set up and use an integrated development environment for ImageJ plugins Create plugins with a user-friendly interface for processing Use established ImageJ plugins for processing and quantification Generate a simple interface based on a real-world example and create other interfaces for other projects Speed up interface development by setting multiple parameters interactively In Detail Advances in image processing have been vital for the scientific and technological communities making it possible to analyze images in greater detail than ever before But as images become larger and more complex advanced processing techniques are required ImageJ is built for the modern challenges of image processing it's one of the key tools in its development letting you automate basic tasks so you can focus on sophisticated in-depth analysis This book demonstrates how to put ImageJ into practice It outlines its key features and demonstrates how to create your own image processing applications using macros and ImageJ plugins Once you've got to grips with the basics of ImageJ you'll then discover how to build a number of different image processing solutions From simple tasks to advanced and automated image processing you'll gain confidence with this innovative and powerful tool however and whatever you are using it for Style and approach A step-by-step guide to image processing and developing macros and plugins in ImageJ The book will progress from using the built-in tools to macros and finally plugins for image processing

**OpenCV By Example** Prateek Joshi, David Millan Escrivá, Vinicius Godoy, 2016-01-22 Enhance your understanding of Computer Vision and image processing by developing real-world projects in OpenCV 3 About This Book Get to grips with the basics of Computer Vision and image processing This is a step-by-step guide to developing several real-world Computer Vision projects using OpenCV 3 This book takes a special focus on working with Tesseract OCR a free open-source library to recognize text in images Who This Book Is For If you are a software developer with a basic understanding of Computer Vision and image processing and want to develop interesting Computer Vision applications with Open CV this is the book for you Knowledge of C is required What You Will Learn Install OpenCV 3 on your operating system Create the required CMake scripts to compile the C application and manage its dependencies Get to grips with the Computer Vision

workflows and understand the basic image matrix format and filters Understand the segmentation and feature extraction techniques Remove backgrounds from a static scene to identify moving objects for video surveillance Track different objects in a live video using various techniques Use the new OpenCV functions for text detection and recognition with Tesseract In Detail Open CV is a cross platform free for use library that is primarily used for real time Computer Vision and image processing It is considered to be one of the best open source libraries that helps developers focus on constructing complete projects on image processing motion detection and image segmentation Whether you are completely new to the concept of Computer Vision or have a basic understanding of it this book will be your guide to understanding the basic OpenCV concepts and algorithms through amazing real world examples and projects Starting from the installation of OpenCV on your system and understanding the basics of image processing we swiftly move on to creating optical flow video analysis or text recognition in complex scenes and will take you through the commonly used Computer Vision techniques to build your own Open CV projects from scratch By the end of this book you will be familiar with the basics of Open CV such as matrix operations filters and histograms as well as more advanced concepts such as segmentation machine learning complex video analysis and text recognition Style and approach This book is a practical guide with lots of tips and is closely focused on developing Computer vision applications with OpenCV Beginning with the fundamentals the complexity increases with each chapter Sample applications are developed throughout the book that you can execute and use in your own projects

*Computer Vision* Pancham Shukla,Rajanikanth Aluvalu,Shilpa Gite,Uma Maheswari,2023-02-20 This book focuses on the latest developments in the fields of visual AI image processing and computer vision It shows research in basic techniques like image pre processing feature extraction and enhancement along with applications in biometrics healthcare neuroscience and forensics The book highlights algorithms processes novel architectures and results underlying machine intelligence with detailed execution flow of models

**Architectures for Computer Vision** Hong Jeong,2014-08-05 This book provides comprehensive coverage of 3D vision systems from vision models and state of the art algorithms to their hardware architectures for implementation on DSPs FPGA and ASIC chips and GPUs It aims to fill the gaps between computer vision algorithms and real time digital circuit implementations especially with Verilog HDL design The organization of this book is vision and hardware module directed based on Verilog vision modules 3D vision modules parallel vision architectures and Verilog designs for the stereo matching system with various parallel architectures Provides Verilog vision simulators tailored to the design and testing of general vision chips Bridges the differences between C C and HDL to encompass both software realization and chip implementation includes numerous examples that realize vision algorithms and general vision processing in HDL Unique in providing an organized and complete overview of how a real time 3D vision system on chip can be designed Focuses on the digital VLSI aspects and implementation of digital signal processing tasks on hardware platforms such as ASICs and FPGAs for 3D vision systems which have not been comprehensively covered in one single book Provides a timely

view of the pervasive use of vision systems and the challenges of fusing information from different vision modules  
Accompanying website includes software and HDL code packages to enhance further learning and develop advanced systems  
A solution set and lecture slides are provided on the book's companion website The book is aimed at graduate students and researchers in computer vision and embedded systems as well as chip and FPGA designers Senior undergraduate students specializing in VLSI design or computer vision will also find the book to be helpful in understanding advanced applications

**OpenCV 4 for Secret Agents** Joseph Howse, 2019-04-30 Turn futuristic ideas about computer vision and machine learning into demonstrations that are both functional and entertaining Key Features Build OpenCV 4 apps with Python 2 and 3 on desktops and Raspberry Pi Java on Android and C in Unity Detect classify recognize and measure real world objects in real time Work with images from diverse sources including the web research datasets and various cameras Book Description OpenCV 4 is a collection of image processing functions and computer vision algorithms It is open source supports many programming languages and platforms and is fast enough for many real time applications With this handy library you'll be able to build a variety of impressive gadgets OpenCV 4 for Secret Agents features a broad selection of projects based on computer vision machine learning and several application frameworks To enable you to build apps for diverse desktop systems and Raspberry Pi the book supports multiple Python versions from 2.7 to 3.7 For Android app development the book also supports Java in Android Studio and C in the Unity game engine Taking inspiration from the world of James Bond this book will add a touch of adventure and computer vision to your daily routine You'll be able to protect your home and car with intelligent camera systems that analyze obstacles people and even cats In addition to this you'll also learn how to train a search engine to praise or criticize the images that it finds and build a mobile app that speaks to you and responds to your body language By the end of this book you will be equipped with the knowledge you need to advance your skills as an app developer and a computer vision specialist What you will learn Detect motion and recognize gestures to control a smartphone game Detect car headlights and estimate their distance Detect and recognize human and cat faces to trigger an alarm Amplify motion in a real time video to show heartbeats and breaths Make a physics simulation that detects shapes in a real world drawing Build OpenCV 4 projects in Python 3 for desktops and Raspberry Pi Develop OpenCV 4 Android applications in Android Studio and Unity Who this book is for If you are an experienced software developer who is new to computer vision or machine learning and wants to study these topics through creative projects then this book is for you The book will also help existing OpenCV users who want upgrade their projects to OpenCV 4 and new versions of other libraries languages tools and operating systems General familiarity with object oriented programming application development and usage of operating systems OS developer tools and the command line is required **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 [INCREaSE](#) António Mortal,Jaime Aníbal,Jânio Monteiro,Cláudia Sequeira,Jorge Semião,Manuela Moreira da Silva,Miguel Oliveira,2018-01-04 This book presents the proceedings of the INternational CongRess on Engineering and Sustainability in the XXI cEntury INCREaSE 2017 which was held in Faro Portugal from October 11 to 13 2017 The book promotes a multidisciplinary approach to sustainable development exploring a number of transversal challenges It discusses natural and anthropogenic risks tourism and sustainability healthy food water and society sustainable mobility renewable energy and energy efficiency offering perspectives from civil electronics mechanical and food engineering [Intelligent Systems and Applications](#) Kohei Arai,2025-09-22 The 11th Intelligent Systems Conference IntelliSys 2025 held in Amsterdam The Netherlands from 28 29 August 2025 brought together researchers practitioners and experts from around the world to share advancements in intelligent technologies Conducted in a hybrid format the conference facilitated global collaboration and

participation This volume presents a curated selection of 169 peer reviewed papers from a total of 470 submissions covering key areas such as Artificial Intelligence Computer Vision Robotics and Intelligent Systems The contributions reflect the latest research trends practical applications and emerging challenges in these domains We hope that these proceedings serve as a valuable resource for researchers practitioners and students and that they inspire future work and collaborations in the field of intelligent systems

**Proceedings of ICACTCE'23 – The International Conference on Advances in Communication Technology and Computer Engineering**

Celestine Iwendi,Zakaria Boulouard,Natalia Kryvinska,2023-09-23 Today communication technology and computer engineering are intertwined with advances in one field driving advances in the other leading to the development of outstanding technologies This book delves into the latest trends and breakthroughs in the areas of communication Internet of things cloud computing big data artificial intelligence and machine learning This book discusses challenges and opportunities that arise with the integration of communication technology and computer engineering In addition the book examines the ethical and social implications including issues related to privacy security and digital divide and law We have explored the future direction of these fields and the potential for further breakthroughs and innovations The book is intended for a broad audience of undergraduate and graduate students practicing engineers and readers without a technical background who have an interest in learning about communication technology and computer engineering

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