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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

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

apply neural network architectures to build state of the art computer vision applications using the python programming language key featuresgain a fundamental understanding of advanced computer vision and neural network models in use todaycover tasks such as low level vision image classification and object detectiondevelop deep learning models on cloud platforms and optimize them using tensorflow lite and the openvino toolkitbook description computer vision allows machines to gain human level understanding to visualize process and analyze images and videos this book focuses on using tensorflow to help you learn advanced computer vision tasks such as image acquisition processing and analysis you ll start with the key principles of computer vision and deep learning to build a solid foundation before covering neural network architectures and understanding how they work rather than using them as a black box next you ll explore architectures such as vgg resnet inception r cnn ssd yolo and mobilenet as you advance you ll learn to use visual search methods using transfer learning you ll also cover advanced computer vision concepts such as semantic segmentation image inpainting with gan s object tracking video segmentation and action recognition later the book focuses on how machine learning and deep learning concepts can be used to perform tasks such as edge detection and face recognition you ll then discover how to develop powerful neural network models on your pc and on various cloud platforms finally you ll learn to perform model optimization methods to deploy models on edge devices for real time inference by the end of this book you ll have a solid understanding of

computer vision and be able to confidently develop models to automate tasks what you will learnexplore methods of feature extraction and image retrieval and visualize different layers of the neural network modeluse tensorflow for various visual search methods for real world scenariosbuild neural networks or adjust parameters to optimize the performance of modelsunderstand tensorflow deeplab to perform semantic segmentation on images and dcgan for image inpaintingevaluate your model and optimize and integrate it into your application to operate at scaleget up to speed with techniques for performing manual and automated image annotationwho this book is for this book is for computer vision professionals image processing professionals machine learning engineers and ai developers who have some knowledge of machine learning and deep learning and want to build expert level computer vision applications in addition to familiarity with tensorflow python knowledge will be required to get started with this book

build practical applications of computer vision using the opencv library with python this book discusses different facets of computer vision such as image and object detection tracking and motion analysis and their applications with examples the author starts with an introduction to computer vision followed by setting up opencv from scratch using python the next section discusses specialized image processing and segmentation and how images are stored and processed by a computer this involves pattern recognition and image tagging using the opencv library next you ll work with object detection video storage and interpretation and human detection using opencv tracking and motion is also discussed in detail the book also discusses creating complex deep learning models with cnn and rnn the author finally concludes with recent applications and trends in computer vision after reading this book you will be able to understand and implement computer vision and its applications with opencv using python you will also be able to create deep learning models with cnn and rnn and understand how these cutting edge deep learning architectures work what you will learn understand what computer vision is and its overall application in intelligent automation systems discover the deep learning techniques required to build computer vision applications build complex computer vision applications using the latest techniques in opencv python and numpy create practical applications and implementations such as face detection and recognition handwriting recognition object detection and tracking and motion analysis who this book is forthose who have a basic understanding of machine learning and python and are looking to learn computer vision and its applications

machine learning allows for non conventional and productive answers for issues within various fields including problems related to visually perceptive computers applying these strategies and algorithms to the area

of computer vision allows for higher achievement in tasks such as spatial recognition big data collection and image processing there is a need for research that seeks to understand the development and efficiency of current methods that enable machines to see challenges and applications for implementing machine learning in computer vision is a collection of innovative research that combines theory and practice on adopting the latest deep learning advancements for machines capable of visual processing highlighting a wide range of topics such as video segmentation object recognition and 3d modelling this publication is ideally designed for computer scientists medical professionals computer engineers information technology practitioners industry experts scholars researchers and students seeking current research on the utilization of evolving computer vision techniques

learn how to model and train advanced neural networks to implement a variety of computer vision tasks key features train different kinds of deep learning model from scratch to solve specific problems in computer vision combine the power of python keras and tensorflow to build deep learning models for object detection image classification similarity learning image captioning and more includes tips on optimizing and improving the performance of your models under various constraints book description deep learning has shown its power in several application areas of artificial intelligence especially in computer vision computer vision is the science of understanding and manipulating images and finds enormous applications in the areas of robotics automation and so on this book will also show you with practical examples how to develop computer vision applications by leveraging the power of deep learning in this book you will learn different techniques related to object classification object detection image segmentation captioning image generation face analysis and more you will also explore their applications using popular python libraries such as tensorflow and keras this book will help you master state of the art deep learning algorithms and their implementation what you will learn set up an environment for deep learning with python tensorflow and keras define and train a model for image and video classification use features from a pre trained convolutional neural network model for image retrieval understand and implement object detection using the real world pedestrian detection scenario learn about various problems in image captioning and how to overcome them by training images and text together implement similarity matching and train a model for face recognition understand the concept of generative models and use them for image generation deploy your deep learning models and optimize them for high performance who this book is for this book is targeted at data scientists and computer vision practitioners who wish to apply the concepts of deep learning to overcome any problem related to computer vision a basic knowledge of programming in python and some

understanding of machine learning concepts is required to get the best out of this book

leverage the power of java and deep learning to build production grade computer vision applications key featuresbuild real world computer vision applications using the power of neural networks implement image classification object detection and face recognitionknow best practices on effectively building and deploying deep learning models in javabook description although machine learning is an exciting world to explore you may feel confused by all of its theoretical aspects as a java developer you will be used to telling the computer exactly what to do instead of being shown how data is generated this causes many developers to struggle to adapt to machine learning the goal of this book is to walk you through the process of efficiently training machine learning and deep learning models for computer vision using the most up to date techniques the book is designed to familiarize you with neural networks enabling you to train them efficiently customize existing state of the art architectures build real world java applications and get great results in a short space of time you will build real world computer vision applications ranging from a simple java handwritten digit recognition model to real time java autonomous car driving systems and face recognition models by the end of this book you will have mastered the best practices and modern techniques needed to build advanced computer vision java applications and achieve production grade accuracy what you will learndiscover neural networks and their applications in computer visionexplore the popular java frameworks and libraries for deep learningbuild deep neural networks in java implement an end to end image classification application in javaperform real time video object detection using deep learningenhance performance and deploy applications for productionwho this book is for this book is for data scientists machine learning developers and deep learning practitioners with java knowledge who want to implement machine learning and deep neural networks in the computer vision domain you will need to have a basic knowledge of java programming

deep learning algorithms have brought a revolution to the computer vision community by introducing non traditional and efficient solutions to several image related problems that had long remained unsolved or partially addressed this book presents a collection of eleven chapters where each individual chapter explains the deep learning principles of a specific topic introduces reviews of up to date techniques and presents research findings to the computer vision community the book covers a broad scope of topics in deep learning concepts and applications such as accelerating the convolutional neural network inference on field programmable gate arrays fire detection in surveillance applications face recognition action and activity recognition semantic segmentation for autonomous driving

aerial imagery registration robot vision tumor detection and skin lesion segmentation as well as skin melanoma classification the content of this book has been organized such that each chapter can be read independently from the others the book is a valuable companion for researchers for postgraduate and possibly senior undergraduate students who are taking an advanced course in related topics and for those who are interested in deep learning with applications in computer vision image processing and pattern recognition

computer vision principles algorithms applications learning previously entitled computer and machine vision clearly and systematically presents the basic methodology of computer vision covering the essential elements of the theory while emphasizing algorithmic and practical design constraints this fully revised fifth edition has brought in more of the concepts and applications of computer vision making it a very comprehensive and up to date text suitable for undergraduate and graduate students researchers and r d engineers working in this vibrant subject see an interview with the author explaining his approach to teaching and learning computer vision scitechconnect elsevier com computer vision three new chapters on machine learning emphasise the way the subject has been developing two chapters cover basic classification concepts and probabilistic models and the the third covers the principles of deep learning networks and shows their impact on computer vision reflected in a new chapter face detection and recognition a new chapter on object segmentation and shape models reflects the methodology of machine learning and gives practical demonstrations of its application in depth discussions have been included on geometric transformations the em algorithm boosting semantic segmentation face frontalisation rnns and other key topics examples and applications including the location of biscuits foreign bodies faces eyes road lanes surveillance vehicles and pedestrians give the ins and outs of developing real world vision systems showing the realities of practical implementation necessary mathematics and essential theory are made approachable by careful explanations and well illustrated examples the recent developments sections included in each chapter aim to bring students and practitioners up to date with this fast moving subject tailored programming examples code methods illustrations tasks hints and solutions mainly involving matlab and c

a practical guide to understanding the core machine learning and deep learning algorithms and implementing them to create intelligent image processing systems using opencv 4 key featuresgain insights into machine learning algorithms and implement them using opencv 4 and scikit learnget up to speed with intel openvino and its integration with opencv 4implement high performance machine learning models with helpful tips

and best practicesbook description opencv is an opensource library for building computer vision apps the latest release opencv 4 offers a plethora of features and platform improvements that are covered comprehensively in this up to date second edition you ll start by understanding the new features and setting up opencv 4 to build your computer vision applications you will explore the fundamentals of machine learning and even learn to design different algorithms that can be used for image processing gradually the book will take you through supervised and unsupervised machine learning you will gain hands on experience using scikit learn in python for a variety of machine learning applications later chapters will focus on different machine learning algorithms such as a decision tree support vector machines svm and bayesian learning and how they can be used for object detection computer vision operations you will then delve into deep learning and ensemble learning and discover their real world applications such as handwritten digit classification and gesture recognition finally you ll get to grips with the latest intel openvino for building an image processing system by the end of this book you will have developed the skills you need to use machine learning for building intelligent computer vision applications with opencv 4 what you will learnunderstand the core machine learning concepts for image processingexplore the theory behind machine learning and deep learning algorithm designdiscover effective techniques to train your deep learning modelsevaluate machine learning models to improve the performance of your modelsintegrate algorithms such as support vector machines and bayes classifier in your computer vision applicationsuse openvino with opencv 4 to speed up model inferencewho this book is for this book is for computer vision professionals machine learning developers or anyone who wants to learn machine learning algorithms and implement them using opencv 4 if you want to build real world computer vision and image processing applications powered by machine learning then this book is for you working knowledge of python programming is required to get the most out of this book

create powerful accurate and real time computer vision applications using a perfect blend of algorithms and filters also learn about object tracking and foreground extractions with a variety of new filters and algorithms key features filter transform and manipulate images using mat class and opencv framework explore motion detection and object tracking with filters and algorithms build object detectors using deep learning and machine learning algorithms book description an arena that has been positively impacted by the advancements in processing power and performance is the field of computer vision it s only natural that over time more and more algorithms are introduced to perform computer vision tasks more efficiently hands on algorithms for computer vision is a starting point for anyone who is interested in the field of computer vision and

wants to explore the most practical algorithms used by professional computer vision developers the book starts with the basics and builds up over the course of the chapters with hands on examples for each algorithm right from the start you will learn about the required tools for computer vision development and how to install and configure them you ll explore the opencv framework and its powerful collection of libraries and functions starting from the most simple image modifications filtering and transformations you will gradually build up your knowledge of various algorithms until you are able to perform much more sophisticated tasks such as real time object detection using deep learning algorithms what you will learn get to grips with machine learning and artificial intelligence algorithms read write and process images and videos perform mathematical matrix and other types of image data operations create and use histograms from back projection images detect motion extract foregrounds and track objects extract key points with a collection of feature detector algorithms develop cascade classifiers and use them and train and test classifiers employ tensorflow object detection to detect multiple objects who this book is for hands on algorithms for computer vision helps those who want to learn algorithms in computer vision to create and customize their applications this book will also help existing computer vision developers customize their applications a basic understanding of computer vision and programming experience is needed

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

explore opencv 4 to create visually appealing cross platform computer vision applications key features understand basic opencv 4 concepts and algorithms grasp advanced opencv techniques such as 3d reconstruction machine learning and artificial neural networks work with tesseract ocr an open source library to recognize text in images book descriptionopencv is one of the best open source libraries available and can help you focus on constructing complete projects on image processing motion detection and image segmentation whether you re completely new to computer vision or have a basic understanding of its concepts learn opencv 4 by building projects second edition will be your guide to understanding opencv concepts and algorithms through real world examples and projects you ll begin with the installation of opencv and the basics of image processing then you ll cover user interfaces and get deeper into image processing as you progress through the book you ll learn complex computer vision algorithms and explore machine learning and face detection the book then guides you in creating optical flow video analysis and background subtraction in complex scenes in the concluding chapters you ll also learn about text segmentation and recognition and understand the basics of the new and improved deep learning module by the end of this book you ll be familiar with the basics of open cv such as matrix operations filters and histograms and you ll have mastered commonly used computer vision techniques to build opencv projects from scratch what you will learn install opencv 4 on your operating system create cmake scripts to compile your c application understand basic image matrix formats and filters explore segmentation and feature extraction techniques remove backgrounds from static scenes to identify moving objects for surveillance employ various techniques to track objects in a live video work with new opencv functions for text detection and recognition with tesseract get acquainted with important deep learning tools for image classification 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 opencv learn opencv 4 by building projects for you prior knowledge of c will help you understand the concepts covered in this book

get to grips with deep learning techniques for building image processing applications using pytorch with the help of code notebooks and test questions key featuresimplement solutions to 50 real world computer vision applications using pytorchunderstand the theory and working mechanisms of neural network architectures and their implementationdiscover best practices using a custom library created especially for this bookbook description deep learning is the driving force behind many recent advances in various computer vision cv applications this book takes a hands on approach to help you to solve over 50 cv problems using pytorch1 x on real world datasets you ll start by building a neural network nn from scratch using numpy and pytorch and discover best practices for tweaking its hyperparameters you ll then perform image classification using convolutional neural networks and transfer learning and understand how they work as you progress you ll implement multiple use cases of 2d and 3d multi object detection segmentation human pose estimation by learning about the r cnn family ssd yolo u net architectures and the detectron2 platform the book will also guide you in performing facial expression swapping generating new faces and manipulating facial expressions as you explore autoencoders and modern generative adversarial networks you ll learn how to combine cv with nlp techniques such as lstm and transformer and rl techniques such as deep q learning to implement ocr image captioning object detection and a self driving car agent finally you ll move your nn model to production on the aws cloud by the end of this book you ll be able to leverage modern nn architectures to solve over 50 real world cv problems confidently what you will learntrain a nn from scratch with numpy and pytorchimplement 2d and 3d multi object detection and segmentationgenerate digits and deepfakes with autoencoders and advanced gansmanipulate images using cyclegan pix2pixgan stylegan2 and srgancombine cv with nlp to perform ocr image captioning and object detectioncombine cv with reinforcement learning to build agents that play pong and self drive a cardeploy a deep learning model on the aws server using fastapi and dockerimplement over 35 nn architectures and common opencv utilitieswho this book is for this book is for beginners to pytorch and intermediate level machine learning practitioners who are looking to get well versed with computer vision techniques using deep learning and pytorch if you are just getting started with neural networks you ll find the use cases accompanied by notebooks in github present in this book useful basic knowledge of the python programming language and machine learning is all you need to get started

with this book

this practical book shows you how to employ machine learning models to extract information from images ml engineers and data scientists will learn how to solve a variety of image problems including classification object detection autoencoders image generation counting and captioning with proven ml techniques this book provides a great introduction to end to end deep learning dataset creation data preprocessing model design model training evaluation deployment and interpretability google engineers valliappa lakshmanan martin görner and ryan gillard show you how to develop accurate and explainable computer vision ml models and put them into large scale production using robust ml architecture in a flexible and maintainable way you ll learn how to design train evaluate and predict with models written in tensorflow or keras you ll learn how to design ml architecture for computer vision tasks select a model such as resnet squeezenet or efficientnet appropriate to your task create an end to end ml pipeline to train evaluate deploy and explain your model preprocess images for data augmentation and to support learnability incorporate explainability and responsible ai best practices deploy image models as web services or on edge devices monitor and manage ml models

learning the fundamentals of image processing puts a powerful and very useful tool at your fingertips learning computer vision in labview is easy to learn has excellent documentation and is the base for prototyping all types of vision based algorithms jobs in image processing are plentiful and being able to learn computer and machine vision will give you a strong background to more easily pick up other computer vision tools such as opencv matlab simplecv and so on suitable for beginning programmers through this course of 26 lectures and over 4 hours of content you ll learn all about computer vision and establish a strong understanding of the concept behind image processing algorithms each chapter closes with exercises in which you will develop your own vision based apps putting your new learned skills into practical use immediately starting with the installation of the labview vision development toolkit this course will take you through the main and fundamental image processing tools used in industry and research resource description page

advanced methods and deep learning in computer vision presents advanced computer vision methods emphasizing machine and deep learning techniques that have emerged during the past 5 10 years the book provides clear explanations of principles and algorithms supported with applications topics covered include machine learning deep learning networks generative adversarial networks deep reinforcement learning self supervised learning extraction of robust features object detection semantic segmentation linguistic descriptions of images visual search

visual tracking 3d shape retrieval image inpainting novelty and anomaly detection this book provides easy learning for researchers and practitioners of advanced computer vision methods but it is also suitable as a textbook for a second course on computer vision and deep learning for advanced undergraduates and graduate students provides an important reference on deep learning and advanced computer methods that was created by leaders in the field illustrates principles with modern real world applications suitable for self learning or as a text for graduate courses

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