

# Opencv

THANK YOU VERY MUCH FOR READING **OPENCV** . AS YOU MAY KNOW, PEOPLE HAVE LOOK HUNDREDS TIMES FOR THEIR CHOSEN READINGS LIKE THIS OPENCV , BUT END UP IN MALICIOUS DOWNLOADS.

RATHER THAN ENJOYING A GOOD BOOK WITH A CUP OF TEA IN THE AFTERNOON, INSTEAD THEY COPE WITH SOME MALICIOUS VIRUS INSIDE THEIR LAPTOP.

OPENCV IS AVAILABLE IN OUR DIGITAL LIBRARY AN ONLINE ACCESS TO IT IS SET AS PUBLIC SO YOU CAN GET IT INSTANTLY.

OUR BOOKS COLLECTION SAVES IN MULTIPLE COUNTRIES, ALLOWING YOU TO GET THE MOST LESS LATENCY TIME TO DOWNLOAD ANY OF OUR BOOKS LIKE THIS ONE.

MERELY SAID, THE OPENCV IS UNIVERSALLY COMPATIBLE WITH ANY DEVICES TO READ

## COMPUTER VISION WITH OPENCV 3 AND QT5 - AMIN AHMADI TAZEKANDI 2018-01-02

BLEND THE POWER OF QT WITH OPENCV TO BUILD CROSS-PLATFORM COMPUTER VISION APPLICATIONS KEY FEATURES [?] START CREATING ROBUST APPLICATIONS WITH THE POWER OF OPENCV AND QT COMBINED [?] LEARN FROM SCRATCH HOW TO DEVELOP CROSS-PLATFORM COMPUTER VISION APPLICATIONS [?] ACCENTUATE YOUR OPENCV APPLICATIONS BY DEVELOPING THEM WITH QT BOOK DESCRIPTION DEVELOPERS HAVE BEEN USING OPENCV LIBRARY TO DEVELOP COMPUTER VISION APPLICATIONS FOR A LONG TIME. HOWEVER, THEY NOW NEED A MORE EFFECTIVE TOOL TO GET THE JOB DONE AND IN A MUCH BETTER AND MODERN WAY. QT IS ONE OF THE MAJOR FRAMEWORKS AVAILABLE FOR THIS TASK AT THE MOMENT. THIS BOOK WILL TEACH YOU TO DEVELOP APPLICATIONS WITH THE COMBINATION OF OPENCV 3 AND QT5, AND HOW TO CREATE CROSS-PLATFORM COMPUTER VISION APPLICATIONS. WE'LL BEGIN BY INTRODUCING QT, ITS IDE, AND ITS SDK. NEXT YOU'LL LEARN HOW TO USE THE OPENCV API TO INTEGRATE BOTH TOOLS, AND SEE HOW TO CONFIGURE QT TO USE OPENCV. YOU'LL GO ON TO BUILD A FULL-FLEDGED COMPUTER VISION APPLICATION THROUGHOUT THE BOOK. LATER, YOU'LL CREATE A STUNNING UI APPLICATION USING THE QT WIDGETS TECHNOLOGY, WHERE YOU'LL DISPLAY THE IMAGES AFTER THEY ARE PROCESSED IN AN EFFICIENT WAY. AT THE END OF THE BOOK, YOU'LL LEARN HOW TO CONVERT OPENCV MAT TO QT QImage. YOU'LL ALSO SEE HOW TO EFFICIENTLY PROCESS IMAGES TO FILTER THEM, TRANSFORM THEM, DETECT OR TRACK OBJECTS AS WELL AS ANALYZE VIDEO. YOU'LL BECOME BETTER AT DEVELOPING OPENCV APPLICATIONS. WHAT YOU WILL LEARN [?] GET AN INTRODUCTION TO QT IDE AND SDK [?] BE INTRODUCED TO OPENCV AND SEE HOW TO COMMUNICATE BETWEEN OPENCV AND QT [?] UNDERSTAND HOW TO CREATE UI USING QT WIDGETS [?] LEARN TO DEVELOP CROSS-PLATFORM APPLICATIONS USING OPENCV 3 AND QT 5 [?] EXPLORE THE MULTITHREADED APPLICATION DEVELOPMENT FEATURES OF QT5 [?] IMPROVE OPENCV 3 APPLICATION DEVELOPMENT USING QT5 [?] BUILD, TEST, AND DEPLOY QT AND OPENCV APPS, EITHER DYNAMICALLY OR STATICALLY [?] SEE COMPUTER VISION TECHNOLOGIES SUCH AS FILTERING AND TRANSFORMATION OF IMAGES, DETECTING AND MATCHING OBJECTS, TEMPLATE MATCHING, OBJECT TRACKING, VIDEO AND MOTION ANALYSIS, AND MUCH MORE [?] BE INTRODUCED TO QML AND QT QUICK FOR IOS AND ANDROID APPLICATION DEVELOPMENT WHO THIS BOOK IS FOR THIS BOOK IS FOR READERS INTERESTED IN BUILDING COMPUTER VISION APPLICATIONS. INTERMEDIATE KNOWLEDGE OF C++ PROGRAMMING IS EXPECTED. EVEN THOUGH NO KNOWLEDGE OF QT5 AND OPENCV 3 IS ASSUMED, IF YOU'RE FAMILIAR WITH THESE FRAMEWORKS, YOU'LL BENEFIT.

## LEARN OPENCV 4.5 WITH PYTHON 3.7 BY EXAMPLES - JAMES CHEN

WHAT THIS BOOK IS ABOUT WHEN YOU SEARCHED FOR THIS BOOK, YOU HAVE ALREADY KNOWN THE IMPORTANCE OF THE OPENCV/PYTHON IN THE FIELDS OF COMPUTER VISION, IMAGE PROCESSING AND MACHINE LEARNING. THIS BOOK BEGINS WITH STEP-BY-STEP INSTRUCTIONS OF INSTALLATION AS WELL AS A SIMPLE HELLO WORLD, THEN GETS INTO THE OPENCV BASICS, IMAGE PROCESSING, OBJECT DETECTION AND FINALLY MACHINE LEARNING. KEY FEATURES EXAMPLE FOR EVERY TOPIC, ALL THE SOURCE CODES ARE AVAILABLE IN GITHUB. LINE BY LINE EXPLANATION OF THE SOURCE CODES. FOCUS MAINLY ON IMPLEMENTATION OF ALGORITHMS, RATHER THAN MATHEMATICAL THEORIES. WHOM THIS BOOK IS FOR THIS BOOK IS FOR PEOPLE WITH A VARIETY OF COMPUTER PROGRAMMING LEVELS, FROM THOSE WITH VERY LIMITED KNOWLEDGE OF COMPUTER VISION TO THE EXPERIENCED ONES. THE READERS DO NOT NEED TO HAVE PREVIOUS EXPERIENCES OF PYTHON/OPENCV. NO MATTER YOU ARE A BEGINNER OR EXPERIENCED PROGRAMMER, AS LONG AS YOU WANT TO LEARN OPENCV WITH PYTHON, YOU WILL BENEFIT FROM THIS BOOK. TABLE OF CONTENTS 1. INTRODUCTION 1.1 WHAT IS OPENCV 1.2 WHOM THIS BOOK IS FOR 1.3 HOW TO GET THE 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 PLAY YOUTUBE VIDEO 3.5 IMAGE FUNDAMENTALS 3.6 DRAW SHAPES 3.7 DRAW TEXTS 3.8 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 CHANGE 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) ABOUT THE AUTHOR INDEX

## 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 4 COMPUTER VISION APPLICATION PROGRAMMING COOKBOOK - DAVID MILLER IN ESCRIVAO 2019-05-03

DISCOVER INTERESTING RECIPES TO HELP YOU UNDERSTAND THE CONCEPTS OF OBJECT DETECTION, IMAGE PROCESSING, AND FACIAL DETECTION KEY FEATURES EXPLORE THE LATEST FEATURES AND APIS IN OPENCV 4 AND BUILD COMPUTER VISION ALGORITHMS DEVELOP EFFECTIVE, ROBUST, AND FAIL-SAFE VISION FOR YOUR APPLICATIONS BUILD COMPUTER VISION ALGORITHMS WITH MACHINE LEARNING CAPABILITIES BOOK DESCRIPTION OPENCV IS AN IMAGE AND VIDEO PROCESSING LIBRARY USED FOR ALL TYPES OF IMAGE AND VIDEO ANALYSIS. THROUGHOUT THE BOOK, YOU'LL WORK THROUGH RECIPES THAT IMPLEMENT A VARIETY OF TASKS, SUCH AS FACIAL RECOGNITION AND DETECTION. WITH 70 SELF-CONTAINED TUTORIALS, THIS BOOK EXAMINES COMMON PAIN POINTS AND BEST PRACTICES FOR COMPUTER VISION (CV) DEVELOPERS. EACH RECIPE ADDRESSES A SPECIFIC PROBLEM AND OFFERS A PROVEN, BEST-PRACTICE SOLUTION WITH INSIGHTS INTO HOW IT WORKS, SO THAT YOU CAN COPY THE CODE AND CONFIGURATION FILES AND MODIFY THEM TO SUIT YOUR NEEDS. THIS BOOK BEGINS BY SETTING UP OPENCV, AND EXPLAINS HOW TO MANIPULATE PIXELS. YOU'LL UNDERSTAND HOW YOU CAN PROCESS IMAGES WITH CLASSES AND COUNT PIXELS WITH HISTOGRAMS. YOU'LL ALSO LEARN DETECTING, DESCRIBING, AND MATCHING INTEREST POINTS. AS YOU ADVANCE THROUGH THE CHAPTERS, YOU'LL GET TO GRIPS WITH ESTIMATING PROJECTIVE RELATIONS IN IMAGES, RECONSTRUCTING 3D SCENES, PROCESSING VIDEO SEQUENCES, AND TRACKING VISUAL MOTION. IN THE FINAL CHAPTERS, YOU'LL COVER DEEP LEARNING CONCEPTS SUCH AS FACE AND OBJECT DETECTION. BY THE END OF THE BOOK, YOU'LL BE ABLE TO CONFIDENTLY IMPLEMENT A RANGE TO COMPUTER VISION ALGORITHMS TO MEET THE TECHNICAL REQUIREMENTS OF YOUR COMPLEX CV PROJECTS WHAT YOU WILL LEARN INSTALL AND CREATE A PROGRAM USING THE OPENCV LIBRARY SEGMENT IMAGES INTO HOMOGENOUS REGIONS AND EXTRACT MEANINGFUL OBJECTS APPLY IMAGE FILTERS TO ENHANCE IMAGE CONTENT EXPLOIT IMAGE GEOMETRY TO RELAY DIFFERENT VIEWS OF A PICTURED SCENE CALIBRATE THE CAMERA FROM DIFFERENT IMAGE OBSERVATIONS DETECT PEOPLE AND OBJECTS IN IMAGES USING MACHINE LEARNING TECHNIQUES RECONSTRUCT A 3D SCENE FROM IMAGES EXPLORE FACE DETECTION USING DEEP LEARNING WHO THIS BOOK IS FOR IF YOU'RE A CV DEVELOPER OR PROFESSIONAL WHO ALREADY USES OR WOULD LIKE TO USE OPENCV FOR BUILDING COMPUTER VISION SOFTWARE, THIS BOOK IS FOR YOU. YOU'LL ALSO FIND THIS BOOK USEFUL IF YOU'RE A C++ PROGRAMMER LOOKING TO EXTEND YOUR COMPUTER VISION SKILLSET BY LEARNING OPENCV.

## LEARNING OPENCV 3 COMPUTER VISION WITH PYTHON - JOE MINICHINO 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.

## HANDS-ON GPU-ACCELERATED COMPUTER VISION WITH OPENCV AND CUDA - BHAUMIK VAIDYA 2018-09-26

DISCOVER HOW CUDA ALLOWS OPENCV TO HANDLE COMPLEX AND RAPIDLY GROWING IMAGE DATA PROCESSING IN COMPUTER AND MACHINE VISION BY ACCESSING THE POWER OF

GPU KEY FEATURES EXPLORE EXAMPLES TO LEVERAGE THE GPU PROCESSING POWER WITH OPENCV AND CUDA ENHANCE THE PERFORMANCE OF ALGORITHMS ON EMBEDDED HARDWARE PLATFORMS DISCOVER C++ AND PYTHON LIBRARIES FOR GPU ACCELERATION

**Book Description** COMPUTER VISION HAS BEEN REVOLUTIONIZING A WIDE RANGE OF INDUSTRIES, AND OPENCV IS THE MOST WIDELY CHOSEN TOOL FOR COMPUTER VISION WITH ITS ABILITY TO WORK IN MULTIPLE PROGRAMMING LANGUAGES. NOWADAYS, IN COMPUTER VISION, THERE IS A NEED TO PROCESS LARGE IMAGES IN REAL TIME, WHICH IS DIFFICULT TO HANDLE FOR OPENCV ON ITS OWN. THIS IS WHERE CUDA COMES INTO THE PICTURE, ALLOWING OPENCV TO LEVERAGE POWERFUL NVIDIA GPUS. THIS BOOK PROVIDES A DETAILED OVERVIEW OF INTEGRATING OPENCV WITH CUDA FOR PRACTICAL APPLICATIONS. TO START WITH, YOU'LL UNDERSTAND GPU PROGRAMMING WITH CUDA, AN ESSENTIAL ASPECT FOR COMPUTER VISION DEVELOPERS WHO HAVE NEVER WORKED WITH GPUS. YOU'LL THEN MOVE ON TO EXPLORING OPENCV ACCELERATION WITH GPUS AND CUDA BY WALKING THROUGH SOME PRACTICAL EXAMPLES. ONCE YOU HAVE GOT TO GRIPS WITH THE CORE CONCEPTS, YOU'LL FAMILIARIZE YOURSELF WITH DEPLOYING OPENCV APPLICATIONS ON NVIDIA JETSON TX1, WHICH IS POPULAR FOR COMPUTER VISION AND DEEP LEARNING APPLICATIONS. THE LAST CHAPTERS OF THE BOOK EXPLAIN PYCUDA, A PYTHON LIBRARY THAT LEVERAGES THE POWER OF CUDA AND GPUS FOR ACCELERATIONS AND CAN BE USED BY COMPUTER VISION DEVELOPERS WHO USE OPENCV WITH PYTHON. BY THE END OF THIS BOOK, YOU'LL HAVE ENHANCED COMPUTER VISION APPLICATIONS WITH THE HELP OF THIS BOOK'S HANDS-ON APPROACH. WHAT YOU WILL LEARN

**Understand how to access GPU device properties and capabilities from CUDA programs**  
**Learn how to accelerate searching and sorting algorithms**  
**Detect shapes such as lines and circles in images**  
**Explore object tracking and detection with algorithms**  
**Process videos using different video analysis techniques in Jetson TX1**  
**Access GPU device properties from the PyCUDA program**  
**Understand how kernel execution works**

**Who this book is for** THIS BOOK IS A GO-TO GUIDE FOR YOU IF YOU ARE A DEVELOPER WORKING WITH OPENCV AND WANT TO LEARN HOW TO PROCESS MORE COMPLEX IMAGE DATA BY EXPLOITING GPU PROCESSING. A THOROUGH UNDERSTANDING OF COMPUTER VISION CONCEPTS AND PROGRAMMING LANGUAGES SUCH AS C++ OR PYTHON IS EXPECTED.

**Learning OpenCV 4 Computer Vision with Python 3** - JOSEPH HOWSE 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.

**Learning OpenCV 3** - ADRIAN KAEHLER 2017

"THIS BOOK PROVIDES A WORKING GUIDE TO THE C++ OPEN SOURCE COMPUTER VISION LIBRARY (OPENCV) VERSION 3.X AND GIVES A GENERAL BACKGROUND ON THE FIELD OF COMPUTER VISION SUFFICIENT TO HELP READERS USE OPENCV EFFECTIVELY."--PREFACE.

**Pro Processing for Images and Computer Vision with OpenCV** - BRYAN WC CHUNG 2017-08-26

APPLY THE PROCESSING LANGUAGE TO TASKS INVOLVED IN COMPUTER VISION--TASKS SUCH AS EDGE AND CORNER DETECTION, RECOGNITION OF MOTION BETWEEN FRAMES IN A VIDEO, RECOGNITION OF OBJECTS, MATCHING OF FEATURE POINTS AND SHAPES IN DIFFERENT FRAMES FOR TRACKING PURPOSES, AND MORE. YOU WILL MANIPULATE IMAGES THROUGH CREATIVE EFFECTS, GEOMETRIC TRANSFORMATION, BLENDING OF MULTIPLE IMAGES, AND SO FORTH. EXAMPLES ARE PROVIDED.

**Pro Processing for Images and Computer Vision with OpenCV** IS A STEP-BY-STEP TRAINING TOOL THAT GUIDES YOU THROUGH A SERIES OF WORKED EXAMPLES IN LINEAR ORDER. EACH CHAPTER BEGINS WITH A BASIC DEMONSTRATION, INCLUDING THE CODE TO RECREATE IT ON YOUR OWN SYSTEM. THEN COMES A CREATIVE CHALLENGE BY WHICH TO ENGAGE AND DEVELOP MASTERY OF THE CHAPTER'S TOPIC. THE BOOK ALSO INCLUDES HINTS AND TIPS RELATING TO VISUAL ARTS, INTERACTION DESIGN, AND

INDUSTRIAL BEST PRACTICES. THIS BOOK IS INTENDED FOR ANY DEVELOPER OF ARTISTIC AND OTHERWISE VISUAL APPLICATIONS, SUCH AS IN AUGMENTED REALITY AND DIGITAL EFFECTS, WITH A NEED TO MANIPULATE IMAGES, AND TO RECOGNIZE AND MANIPULATE OBJECTS WITHIN THOSE IMAGES. THE BOOK IS SPECIFICALLY TARGETED AT THOSE MAKING USE OF THE PROCESSING LANGUAGE THAT IS COMMON IN ARTISTIC FIELDS, AND TO JAVA PROGRAMMERS BECAUSE OF PROCESSING'S EASY INTEGRATION INTO THE JAVA PROGRAMMING ENVIRONMENT.

**What You'll Learn**  
MAKE USE OF OPENCV, THE OPEN SOURCE LIBRARY FOR COMPUTER VISION IN THE PROCESSING ENVIRONMENT  
CAPTURE LIVE VIDEO STREAMS AND EXAMINE THEM FRAME-BY-FRAME FOR OBJECTS IN MOTION  
RECOGNIZE SHAPES AND OBJECTS THROUGH TECHNIQUES OF DETECTING LINES, EDGES, CORNERS, AND MORE  
TRANSFORM IMAGES BY SCALING, TRANSLATING, ROTATING, AND ADDITIONALLY THROUGH VARIOUS DISTORTION EFFECTS  
APPLY TECHNIQUES SUCH AS BACKGROUND SUBTRACTION TO ISOLATE MOTION OF OBJECTS IN LIVE VIDEO STREAMS  
DETECT AND TRACK HUMAN FACES AND OTHER OBJECTS BY MATCHING FEATURE POINTS IN DIFFERENT IMAGES OR VIDEO FRAMES

**Who This Book Is For** MEDIA ARTISTS, DESIGNERS, AND CREATIVE CODERS

**Mastering OpenCV with Practical Computer Vision Projects** - DANIEL LIS 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.

**Machine Learning for OpenCV** - MICHAEL BEYELER 2017-07-14

EXPAND YOUR OPENCV KNOWLEDGE AND MASTER KEY CONCEPTS OF MACHINE LEARNING USING THIS PRACTICAL, HANDS-ON GUIDE. ABOUT THIS BOOK

**LOAD, STORE, EDIT, AND VISUALIZE DATA USING OPENCV AND PYTHON**  
**GRASP THE FUNDAMENTAL CONCEPTS OF CLASSIFICATION, REGRESSION, AND CLUSTERING**  
**UNDERSTAND, PERFORM, AND EXPERIMENT WITH MACHINE LEARNING TECHNIQUES USING THIS EASY-TO-FOLLOW GUIDE**  
**EVALUATE, COMPARE, AND CHOOSE THE RIGHT ALGORITHM FOR ANY TASK**

**Who This Book Is For** THIS BOOK TARGETS PYTHON PROGRAMMERS WHO ARE ALREADY FAMILIAR WITH OPENCV; THIS BOOK WILL GIVE YOU THE TOOLS AND UNDERSTANDING REQUIRED TO BUILD YOUR OWN MACHINE LEARNING SYSTEMS, TAILORED TO PRACTICAL REAL-WORLD TASKS.

**What You Will Learn**  
EXPLORE AND MAKE EFFECTIVE USE OF OPENCV'S MACHINE LEARNING MODULE  
LEARN DEEP LEARNING FOR COMPUTER VISION WITH PYTHON  
MASTER LINEAR REGRESSION AND REGULARIZATION TECHNIQUES  
CLASSIFY OBJECTS SUCH AS FLOWER SPECIES, HANDWRITTEN DIGITS, AND PEDESTRIANS  
EXPLORE THE EFFECTIVE USE OF SUPPORT VECTOR MACHINES, BOOSTED DECISION TREES, AND RANDOM FORESTS  
GET ACQUAINTED WITH NEURAL NETWORKS AND DEEP LEARNING TO ADDRESS REAL-WORLD PROBLEMS  
DISCOVER HIDDEN STRUCTURES IN YOUR DATA USING K-MEANS CLUSTERING  
GET TO GRIPS WITH DATA PRE-PROCESSING AND FEATURE ENGINEERING

**In Detail** MACHINE LEARNING IS NO LONGER JUST A BUZZWORD, IT IS ALL AROUND US: FROM PROTECTING YOUR EMAIL, TO AUTOMATICALLY TAGGING FRIENDS IN PICTURES, TO PREDICTING WHAT MOVIES YOU LIKE. COMPUTER VISION IS ONE OF TODAY'S MOST EXCITING APPLICATION FIELDS OF MACHINE LEARNING, WITH DEEP LEARNING DRIVING INNOVATIVE SYSTEMS SUCH AS SELF-DRIVING CARS AND GOOGLE'S DEEPMIND. OPENCV LIES AT THE INTERSECTION OF THESE TOPICS, PROVIDING A COMPREHENSIVE OPEN-SOURCE LIBRARY FOR CLASSIC AS WELL AS STATE-OF-THE-ART COMPUTER VISION AND MACHINE LEARNING ALGORITHMS. IN COMBINATION WITH PYTHON ANACONDA, YOU WILL HAVE ACCESS TO ALL THE OPEN-SOURCE COMPUTING LIBRARIES YOU COULD POSSIBLY ASK FOR. MACHINE LEARNING FOR OPENCV BEGINS BY INTRODUCING YOU TO THE ESSENTIAL CONCEPTS OF STATISTICAL LEARNING, SUCH AS CLASSIFICATION AND REGRESSION. ONCE ALL THE BASICS ARE COVERED, YOU WILL START EXPLORING VARIOUS ALGORITHMS SUCH AS DECISION TREES, SUPPORT VECTOR MACHINES, AND BAYESIAN NETWORKS, AND LEARN HOW TO COMBINE THEM WITH OTHER OPENCV FUNCTIONALITY. AS THE BOOK PROGRESSES, SO WILL YOUR MACHINE LEARNING SKILLS, UNTIL YOU ARE READY TO TAKE ON TODAY'S HOTTEST TOPIC IN THE FIELD: DEEP LEARNING. BY THE END OF THIS BOOK, YOU WILL BE READY TO TAKE ON YOUR OWN MACHINE LEARNING PROBLEMS, EITHER BY BUILDING ON THE EXISTING SOURCE CODE OR DEVELOPING YOUR OWN ALGORITHM FROM SCRATCH!

**Style and Approach** OPENCV MACHINE LEARNING CONNECTS THE FUNDAMENTAL THEORETICAL PRINCIPLES BEHIND MACHINE LEARNING TO THEIR PRACTICAL APPLICATIONS IN A WAY THAT FOCUSES ON ASKING AND ANSWERING THE RIGHT QUESTIONS. THIS BOOK WALKS YOU THROUGH THE KEY ELEMENTS OF OPENCV AND ITS POWERFUL MACHINE LEARNING CLASSES, WHILE DEMONSTRATING HOW TO GET TO GRIPS WITH A RANGE OF MODELS.

**Qt 5 and OpenCV 4 Computer Vision Projects** - ZHUO QINGLIANG 2019-06-21

CREATE IMAGE PROCESSING, OBJECT DETECTION AND FACE RECOGNITION APPS BY LEVERAGING THE POWER OF MACHINE LEARNING AND DEEP LEARNING WITH OPENCV 4 AND QT 5

**Key Features**  
GAIN PRACTICAL INSIGHTS INTO CODE FOR ALL PROJECTS COVERED IN THIS BOOK  
UNDERSTAND MODERN COMPUTER VISION CONCEPTS SUCH AS CHARACTER RECOGNITION, IMAGE PROCESSING AND MODIFICATION  
LEARN TO USE A GRAPHICS PROCESSING UNIT (GPU) AND ITS PARALLEL PROCESSING POWER FOR FILTERING IMAGES QUICKLY

**Book Description** OPENCV AND QT HAVE PROVEN TO BE A WINNING COMBINATION FOR DEVELOPING CROSS-PLATFORM COMPUTER VISION APPLICATIONS. BY LEVERAGING THEIR POWER, YOU CAN CREATE ROBUST APPLICATIONS WITH BOTH AN INTUITIVE GRAPHICAL USER INTERFACE (GUI) AND HIGH-PERFORMANCE CAPABILITIES. THIS BOOK WILL HELP YOU LEARN THROUGH A VARIETY OF REAL-WORLD PROJECTS ON IMAGE PROCESSING, FACE AND TEXT RECOGNITION, OBJECT DETECTION, AND HIGH-PERFORMANCE COMPUTING. YOU'LL BE ABLE TO PROGRESSIVELY BUILD ON YOUR SKILLS BY WORKING ON PROJECTS OF INCREASING COMPLEXITY. YOU'LL BEGIN BY CREATING AN IMAGE VIEWER APPLICATION, BUILDING A USER INTERFACE FROM SCRATCH BY ADDING MENUS, PERFORMING ACTIONS BASED ON KEY-PRESSES, AND APPLYING OTHER FUNCTIONS. AS YOU PROGRESS, THE BOOK WILL GUIDE YOU THROUGH USING OPENCV IMAGE PROCESSING AND MODIFICATION FUNCTIONS TO EDIT AN IMAGE WITH FILTERS AND TRANSFORMATION FEATURES. IN ADDITION TO THIS, YOU'LL EXPLORE THE COMPLEX MOTION ANALYSIS AND FACIAL LANDMARK DETECTION ALGORITHMS, WHICH YOU CAN USE TO BUILD SECURITY AND FACE DETECTION APPLICATIONS. FINALLY, YOU'LL LEARN TO USE PRETRAINED DEEP LEARNING MODELS IN OPENCV AND GPUS TO FILTER IMAGES QUICKLY. BY THE END OF THIS BOOK, YOU WILL HAVE LEARNED HOW TO EFFECTIVELY DEVELOP FULL-FLEDGED COMPUTER VISION APPLICATIONS WITH OPENCV AND QT. WHAT YOU WILL LEARN

**CREATE AN IMAGE VIEWER WITH ALL THE BASIC REQUIREMENTS**  
**CONSTRUCT**

AN IMAGE EDITOR TO FILTER OR TRANSFORM IMAGES  
DEVELOP A SECURITY APP TO DETECT MOVEMENT AND SECURE HOMES  
BUILD AN APP TO DETECT FACIAL LANDMARKS AND APPLY MASKS TO FACES  
CREATE AN APP TO EXTRACT TEXT FROM SCANNED DOCUMENTS AND PHOTOS  
TRAIN AND USE CASCADE CLASSIFIERS AND DL MODELS FOR OBJECT DETECTION  
BUILD AN APP TO MEASURE THE DISTANCE BETWEEN DETECTED OBJECTS  
IMPLEMENT HIGH-SPEED IMAGE FILTERS ON GPU WITH OPEN GRAPHICS LIBRARY (OPENGL)  
WHO THIS BOOK IS FOR THIS BOOK IS FOR ENGINEERS AND DEVELOPERS WHO ARE FAMILIAR WITH BOTH QT AND OPENCV FRAMEWORKS AND ARE CAPABLE OF CREATING SIMPLE PROJECTS USING THEM, BUT WANT TO BUILD THEIR SKILLS TO CREATE PROFESSIONAL-LEVEL PROJECTS USING THEM. FAMILIARITY WITH THE C++ LANGUAGE IS A MUST TO FOLLOW THE EXAMPLE SOURCE CODES IN THIS BOOK.

*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.

*OPENCV 3 BLUEPRINTS* - JOSEPH HOWSE 2015-11-10

EXPAND YOUR KNOWLEDGE OF COMPUTER VISION BY BUILDING AMAZING PROJECTS WITH OPENCV 3  
ABOUT THIS BOOK  
BUILD COMPUTER VISION PROJECTS TO CAPTURE HIGH-QUALITY IMAGE DATA, DETECT AND TRACK OBJECTS, PROCESS THE ACTIONS OF HUMANS OR ANIMALS, AND MUCH MORE  
DISCOVER PRACTICAL AND INTERESTING INNOVATIONS IN COMPUTER VISION WHILE BUILDING ATOP A MATURE OPEN-SOURCE LIBRARY, OPENCV 3  
FAMILIARIZE YOURSELF WITH MULTIPLE APPROACHES AND THEORIES WHEREVER CRITICAL DECISIONS NEED TO BE MADE  
WHO THIS BOOK IS FOR THIS BOOK IS IDEAL FOR YOU IF YOU ASPIRE TO BUILD COMPUTER VISION SYSTEMS THAT ARE SMARTER, FASTER, MORE COMPLEX, AND MORE PRACTICAL THAN THE COMPETITION. THIS IS AN ADVANCED BOOK INTENDED FOR THOSE WHO ALREADY HAVE SOME EXPERIENCE IN SETTING UP AN OPENCV DEVELOPMENT ENVIRONMENT AND BUILDING APPLICATIONS WITH OPENCV. YOU SHOULD BE COMFORTABLE WITH COMPUTER VISION CONCEPTS, OBJECT-ORIENTED PROGRAMMING, GRAPHICS PROGRAMMING, IDEs, AND THE COMMAND LINE. WHAT YOU WILL LEARN  
SELECT AND CONFIGURE CAMERA SYSTEMS TO SEE INVISIBLE LIGHT, FAST MOTION, AND DISTANT OBJECTS  
BUILD A "CAMERA TRAP", AS USED BY NATURE PHOTOGRAPHERS, AND PROCESS PHOTOS TO CREATE BEAUTIFUL EFFECTS  
DEVELOP A FACIAL EXPRESSION RECOGNITION SYSTEM WITH VARIOUS FEATURE EXTRACTION TECHNIQUES AND MACHINE LEARNING METHODS  
BUILD A PANORAMA ANDROID APPLICATION USING THE OPENCV STITCHING MODULE IN C++ WITH NDK SUPPORT  
OPTIMIZE YOUR OBJECT DETECTION MODEL, MAKE IT ROTATION INVARIANT, AND APPLY SCENE-SPECIFIC CONSTRAINTS TO MAKE IT FASTER AND MORE ROBUST  
CREATE A PERSON IDENTIFICATION AND REGISTRATION SYSTEM BASED ON BIOMETRIC PROPERTIES OF THAT PERSON, SUCH AS THEIR FINGERPRINT, IRIS, AND FACE  
FUZE DATA FROM VIDEOS AND GYROSCOPES TO STABILIZE VIDEOS SHOT FROM YOUR MOBILE PHONE AND CREATE HYPERLAPSE STYLE VIDEOS  
IN DETAIL  
COMPUTER VISION IS BECOMING ACCESSIBLE TO A LARGE AUDIENCE OF SOFTWARE DEVELOPERS WHO CAN LEVERAGE MATURE LIBRARIES SUCH AS OPENCV. HOWEVER, AS THEY MOVE BEYOND THEIR FIRST EXPERIMENTS IN COMPUTER VISION, DEVELOPERS MAY STRUGGLE TO ENSURE THAT THEIR SOLUTIONS ARE SUFFICIENTLY WELL OPTIMIZED, WELL TRAINED, ROBUST, AND ADAPTIVE IN REAL-WORLD CONDITIONS. WITH SUFFICIENT KNOWLEDGE OF OPENCV, THESE DEVELOPERS WILL HAVE ENOUGH CONFIDENCE TO GO ABOUT CREATING PROJECTS IN THE FIELD OF COMPUTER VISION. THIS BOOK WILL HELP YOU TACKLE INCREASINGLY CHALLENGING COMPUTER VISION PROBLEMS THAT YOU MAY FACE IN YOUR CAREERS. IT MAKES USE OF OPENCV 3 TO WORK AROUND SOME INTERESTING PROJECTS. INSIDE THESE PAGES, YOU WILL FIND PRACTICAL AND INNOVATIVE APPROACHES THAT ARE BATTLE-TESTED IN THE AUTHORS' INDUSTRY EXPERIENCE AND RESEARCH. EACH CHAPTER COVERS THE THEORY AND PRACTICE OF MULTIPLE COMPLEMENTARY APPROACHES SO THAT YOU WILL BE ABLE TO CHOOSE WISELY IN YOUR FUTURE PROJECTS. YOU WILL ALSO GAIN INSIGHTS INTO THE ARCHITECTURE AND ALGORITHMS THAT UNDERPIN OPENCV'S FUNCTIONALITY. WE BEGIN BY TAKING A CRITICAL LOOK AT INPUTS IN ORDER TO DECIDE

WHICH KINDS OF LIGHT, CAMERAS, LENSES, AND IMAGE FORMATS ARE BEST SUITED TO A GIVEN PURPOSE. WE PROCEED TO CONSIDER THE FINER ASPECTS OF COMPUTATIONAL PHOTOGRAPHY AS WE BUILD AN AUTOMATED CAMERA TO ASSIST NATURE PHOTOGRAPHERS. YOU WILL GAIN A DEEP UNDERSTANDING OF SOME OF THE MOST WIDELY APPLICABLE AND RELIABLE TECHNIQUES IN OBJECT DETECTION, FEATURE SELECTION, TRACKING, AND EVEN BIOMETRIC RECOGNITION. WE WILL ALSO BUILD ANDROID PROJECTS IN WHICH WE EXPLORE THE COMPLEXITIES OF CAMERA MOTION: FIRST IN PANORAMIC IMAGE STITCHING AND THEN IN VIDEO STABILIZATION. BY THE END OF THE BOOK, YOU WILL HAVE A MUCH RICHER UNDERSTANDING OF IMAGING, MOTION, MACHINE LEARNING, AND THE ARCHITECTURE OF COMPUTER VISION LIBRARIES AND APPLICATIONS! STYLE AND APPROACH  
THIS BOOK COVERS A COMBINATION OF THEORY AND PRACTICE. WE EXAMINE BLUEPRINTS FOR SPECIFIC PROJECTS AND DISCUSS THE PRINCIPLES BEHIND THESE BLUEPRINTS, IN DETAIL.

*OPENCV 3 COMPUTER VISION WITH PYTHON COOKBOOK* - ALEKSEI SPIZHEVOI 2018-03-23

RECIPE-BASED APPROACH TO TACKLE THE MOST COMMON PROBLEMS IN COMPUTER VISION BY LEVERAGING THE FUNCTIONALITY OF OPENCV USING PYTHON APIS  
KEY FEATURES  
BUILD COMPUTER VISION APPLICATIONS WITH OPENCV FUNCTIONALITY VIA PYTHON API  
GET TO GRIPS WITH IMAGE PROCESSING, MULTIPLE VIEW GEOMETRY, AND MACHINE LEARNING  
LEARN TO USE DEEP LEARNING MODELS FOR IMAGE CLASSIFICATION, OBJECT DETECTION, AND FACE RECOGNITION  
BOOK DESCRIPTION  
OPENCV 3 IS A NATIVE CROSS-PLATFORM LIBRARY FOR COMPUTER VISION, MACHINE LEARNING, AND IMAGE PROCESSING. OPENCV'S CONVENIENT HIGH-LEVEL APIS HIDE VERY POWERFUL INTERNALS DESIGNED FOR COMPUTATIONAL EFFICIENCY THAT CAN TAKE ADVANTAGE OF MULTICORE AND GPU PROCESSING. THIS BOOK WILL HELP YOU TACKLE INCREASINGLY CHALLENGING COMPUTER VISION PROBLEMS BY PROVIDING A NUMBER OF RECIPES THAT YOU CAN USE TO IMPROVE YOUR APPLICATIONS. IN THIS BOOK, YOU WILL LEARN HOW TO PROCESS AN IMAGE BY MANIPULATING PIXELS AND ANALYZE AN IMAGE USING HISTOGRAMS. THEN, WE'LL SHOW YOU 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 A MULTIPLE-VIEW ANALYSIS. LATER, YOU'LL WORK ON RECONSTRUCTING A 3D SCENE FROM IMAGES, CONVERTING LOW-LEVEL PIXEL INFORMATION TO HIGH-LEVEL CONCEPTS FOR APPLICATIONS SUCH AS OBJECT DETECTION AND RECOGNITION. YOU'LL ALSO 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 AND NEURAL NETWORKS. BY THE END OF THE BOOK, YOU'LL BE ABLE TO APPLY YOUR SKILLS IN OPENCV TO CREATE COMPUTER VISION APPLICATIONS IN VARIOUS DOMAINS. WHAT YOU WILL LEARN  
GET FAMILIAR WITH LOW-LEVEL IMAGE PROCESSING METHODS  
SEE THE COMMON LINEAR ALGEBRA TOOLS NEEDED IN COMPUTER VISION  
WORK WITH DIFFERENT CAMERA MODELS AND EPIPOLAR GEOMETRY  
FIND OUT HOW TO DETECT INTERESTING POINTS IN IMAGES AND COMPARE THEM  
BINARIZE IMAGES AND MASK OUT REGIONS OF INTEREST  
DETECT OBJECTS AND TRACK THEM IN VIDEOS  
WHO THIS BOOK IS FOR  
THIS BOOK IS FOR DEVELOPERS WHO HAVE A BASIC KNOWLEDGE OF PYTHON. IF YOU ARE AWARE OF THE BASICS OF OPENCV AND ARE READY TO BUILD COMPUTER VISION SYSTEMS THAT ARE SMARTER, FASTER, MORE COMPLEX, AND MORE PRACTICAL THAN THE COMPETITION, THEN THIS BOOK IS FOR YOU.

*OPENCV: COMPUTER VISION PROJECTS WITH PYTHON* - JOSEPH HOWSE 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 SENSOR KINECT - 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!.

### OpenCV 3.x with Python by Example - Gabriel Garrido Calvo 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.

### Learn OpenCV 4 by Building Projects - David Millán Escrivá 2018-11-30

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 description OpenCV is one of the best open source libraries available, and can help you focus on constructing complete projects on image processing, motion detection, and image segmentation. 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 OpenCV, 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.

### Learning OpenCV - Gary Bradski 2008-09-24

"This library is useful for practitioners, and is an excellent tool for those entering the field: it is a set of computer vision algorithms that work as advertised." -William T. Freeman, Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology Learning OpenCV puts you in the middle of the rapidly expanding field of computer vision. Written by the creators of the free open source OpenCV library, this book introduces you to computer vision and demonstrates how you can quickly build applications that enable computers to "see" and make decisions based on that data. Computer vision is everywhere-in security systems, manufacturing inspection systems, medical image analysis, unmanned aerial vehicles, and more. It stitches Google Maps and Google Earth together, checks the pixels on LCD screens, and makes sure the stitches in your shirt are sewn properly. OpenCV provides an easy-to-use computer vision framework and a comprehensive library with more than 500 functions that can run vision code in real time. Learning OpenCV will teach any developer or hobbyist to use the framework quickly with the help of hands-on

exercises in each chapter. This book includes: A thorough introduction to OpenCV getting input from cameras transforming images segmenting images and shape matching pattern recognition, including face detection tracking and motion in 2 and 3 dimensions 3D reconstruction from stereo vision machine learning algorithms getting machines to see is a challenging but entertaining goal. Whether you want to build simple or sophisticated vision applications, Learning OpenCV is the book you need to get started.

### Learning OpenCV - Gary R. Bradski 2008

OpenCV Computer Vision Application Programming Cookbook Second Edition - Robert Laganière 2014-08-26

OpenCV 3 Computer Vision Application Programming Cookbook is appropriate for novice C++ programmers who want to learn how to use the OpenCV library to build computer vision applications. It is also suitable for professional software developers wishing to be introduced to the concepts of computer vision programming. It can also be used as a companion book in a university-level computer vision courses. It constitutes an excellent reference for graduate students and researchers in image processing and computer vision.

### 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 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.

### OpenCV by Example - Prateek Joshi 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 OpenCV, 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 OpenCV 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.

**MASTERING OPENCV 4** - ROY SHILKROT 2018-12-27

WORK ON PRACTICAL COMPUTER VISION PROJECTS COVERING ADVANCED OBJECT DETECTOR TECHNIQUES AND MODERN DEEP LEARNING AND MACHINE LEARNING ALGORITHMS KEY FEATURES LEARN ABOUT THE NEW FEATURES THAT HELP UNLOCK THE FULL POTENTIAL OF OPENCV 4 BUILD FACE DETECTION APPLICATIONS WITH A CASCADE CLASSIFIER USING FACE LANDMARKS CREATE AN OPTICAL CHARACTER RECOGNITION (OCR) MODEL USING DEEP LEARNING AND CONVOLUTIONAL NEURAL NETWORKS BOOK DESCRIPTION MASTERING OPENCV, NOW IN ITS THIRD EDITION, TARGETS COMPUTER VISION ENGINEERS TAKING THEIR FIRST STEPS TOWARD MASTERING OPENCV. KEEPING THE MATHEMATICAL FORMULATIONS TO A SOLID BUT BARE MINIMUM, THE BOOK DELIVERS COMPLETE PROJECTS FROM IDEATION TO RUNNING CODE, TARGETING CURRENT HOT TOPICS IN COMPUTER VISION SUCH AS FACE RECOGNITION, LANDMARK DETECTION AND POSE ESTIMATION, AND NUMBER RECOGNITION WITH DEEP CONVOLUTIONAL NETWORKS. YOU'LL LEARN FROM EXPERIENCED OPENCV EXPERTS HOW TO IMPLEMENT COMPUTER VISION PRODUCTS AND PROJECTS BOTH IN ACADEMIA AND INDUSTRY IN A COMFORTABLE PACKAGE. YOU'LL GET ACQUAINTED WITH API FUNCTIONALITY AND GAIN INSIGHTS INTO DESIGN CHOICES IN A COMPLETE COMPUTER VISION PROJECT. YOU'LL ALSO GO BEYOND THE BASICS OF COMPUTER VISION TO IMPLEMENT SOLUTIONS FOR COMPLEX IMAGE PROCESSING PROJECTS. BY THE END OF THE BOOK, YOU WILL HAVE CREATED VARIOUS WORKING PROTOTYPES WITH THE HELP OF PROJECTS IN THE BOOK AND BE WELL VERSED WITH THE NEW FEATURES OF OPENCV4. WHAT YOU WILL LEARN BUILD REAL-WORLD COMPUTER VISION PROBLEMS WITH WORKING OPENCV CODE SAMPLES UNCOVER BEST PRACTICES IN ENGINEERING AND MAINTAINING OPENCV PROJECTS EXPLORE ALGORITHMIC DESIGN APPROACHES FOR COMPLEX COMPUTER VISION TASKS WORK WITH OPENCV'S MOST UPDATED API (v4.0.0) THROUGH PROJECTS UNDERSTAND 3D SCENE RECONSTRUCTION AND STRUCTURE FROM MOTION (SfM) STUDY CAMERA CALIBRATION AND OVERLAY AR USING THE ARUCO MODULE WHO THIS BOOK IS FOR THIS BOOK IS FOR THOSE WHO HAVE A BASIC KNOWLEDGE OF OPENCV AND ARE COMPETENT C++ PROGRAMMERS. YOU NEED TO HAVE AN UNDERSTANDING OF SOME OF THE MORE THEORETICAL/MATHEMATICAL CONCEPTS, AS WE MOVE QUITE QUICKLY THROUGHOUT THE BOOK.

**OPENCV ANDROID PROGRAMMING BY EXAMPLE** - AMGAD MUHAMMAD 2015-12-15

DEVELOP VISION-AWARE AND INTELLIGENT ANDROID APPLICATIONS WITH THE ROBUST OPENCV LIBRARY ABOUT THIS BOOK THIS IS THE MOST UP-TO-DATE BOOK ON OPENCV ANDROID PROGRAMMING ON THE MARKET AT THE MOMENT. THERE IS NO DIRECT COMPETITION FOR OUR TITLE. BASED ON A TECHNOLOGY THAT IS INCREASING IN POPULARITY, PROVEN BY ACTIVITY IN FORUMS RELATED TO THIS TOPIC. THIS BOOK UNIQUELY COVERS APPLICATIONS SUCH AS THE PANORAMIC VIEWER AND AUTOMATIC SELFIE, AMONG OTHERS. WHO THIS BOOK IS FOR IF YOU ARE AN ANDROID DEVELOPER AND WANT TO KNOW HOW TO IMPLEMENT VISION-AWARE APPLICATIONS USING OPENCV, THEN THIS BOOK IS DEFINITELY FOR YOU. IT WOULD BE VERY HELPFUL IF YOU UNDERSTAND THE BASICS OF IMAGE PROCESSING AND COMPUTER VISION, BUT NO PRIOR EXPERIENCE IS REQUIRED WHAT YOU WILL LEARN IDENTIFY AND INSTALL ALL THE ELEMENTS NEEDED TO START BUILDING VISION-AWARE ANDROID APPLICATIONS EXPLORE IMAGE REPRESENTATION, COLORED AND GRAY SCALE RECOGNIZE AND APPLY CONVOLUTION OPERATIONS AND FILTERING TO DEAL WITH NOISY DATA USE DIFFERENT SHAPE ANALYSIS TECHNIQUES EXTRACT AND IDENTIFY INTEREST POINTS IN AN IMAGE UNDERSTAND AND PERFORM OBJECT DETECTION RUN NATIVE COMPUTER VISION ALGORITHMS AND GAIN PERFORMANCE BOOSTS IN DETAIL STARTING FROM THE BASICS OF COMPUTER VISION AND OPENCV, WE'LL TAKE YOU ALL THE WAY TO CREATING EXCITING APPLICATIONS. YOU WILL DISCOVER THAT, THOUGH COMPUTER VISION IS A CHALLENGING SUBJECT, THE IDEAS AND ALGORITHMS USED ARE SIMPLE AND INTUITIVE, AND YOU WILL APPRECIATE THE ABSTRACTION LAYER THAT OPENCV USES TO DO THE HEAVY LIFTING FOR YOU. PACKED WITH MANY EXAMPLES, THE BOOK WILL HELP YOU UNDERSTAND THE MAIN DATA STRUCTURES USED WITHIN OPENCV, AND HOW YOU CAN USE THEM TO GAIN PERFORMANCE BOOSTS. NEXT WE WILL DISCUSS AND USE SEVERAL IMAGE PROCESSING ALGORITHMS SUCH AS HISTOGRAM EQUALIZATION, FILTERS, AND COLOR SPACE CONVERSION. YOU THEN WILL LEARN ABOUT IMAGE GRADIENTS AND HOW THEY ARE USED IN MANY SHAPE ANALYSIS TECHNIQUES SUCH AS EDGE DETECTION, HOUGH LINE TRANSFORM, AND HOUGH CIRCLE TRANSFORM. IN ADDITION TO USING SHAPE ANALYSIS TO FIND THINGS IN IMAGES, YOU WILL LEARN HOW TO DESCRIBE OBJECTS IN IMAGES IN A MORE ROBUST WAY USING DIFFERENT FEATURE DETECTORS AND DESCRIPTORS. BY THE END OF THIS BOOK, YOU WILL BE ABLE TO MAKE INTELLIGENT DECISIONS USING THE FAMOUS ADABOOST LEARNING ALGORITHM. STYLE AND APPROACH AN EASY-TO-FOLLOW TUTORIAL PACKED WITH HANDS-ON EXAMPLES. EACH TOPIC IS EXPLAINED AND PLACED IN CONTEXT, AND THE BOOK SUPPLIES FULL DETAILS OF THE CONCEPTS USED FOR ADDED PROFICIENCY.

**MASTERING OPENCV 4 WITH PYTHON** - ALBERTO FERNANDEZ VILLAN 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 FEATURES DEVELOP YOUR COMPUTER VISION SKILLS BY MASTERING ALGORITHMS IN OPEN SOURCE COMPUTER VISION 4 (OPENCV 4) AND PYTHON APPLY MACHINE LEARNING AND DEEP LEARNING TECHNIQUES WITH TENSORFLOW AND KERAS DISCOVER THE MODERN DESIGN PATTERNS YOU SHOULD AVOID WHEN DEVELOPING EFFICIENT COMPUTER VISION APPLICATIONS BOOK 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 LEARN HANDLE FILES AND IMAGES, AND EXPLORE VARIOUS IMAGE PROCESSING TECHNIQUES EXPLORE IMAGE TRANSFORMATIONS, INCLUDING TRANSLATION, RESIZING, AND CROPPING GAIN INSIGHTS INTO BUILDING HISTOGRAMS BRUSH UP ON CONTOUR DETECTION, FILTERING, AND DRAWING WORK WITH AUGMENTED REALITY TO BUILD MARKER-BASED AND MARKERLESS APPLICATIONS WORK WITH THE MAIN MACHINE LEARNING ALGORITHMS IN OPENCV EXPLORE THE DEEP LEARNING PYTHON LIBRARIES AND OPENCV DEEP LEARNING CAPABILITIES CREATE COMPUTER VISION AND DEEP LEARNING WEB APPLICATIONS WHO 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.

**OPENCV COMPUTER VISION WITH PYTHON** - JOSEPH HOWSE 2015-01-07

LEARN TO CAPTURE VIDEOS, MANIPULATE IMAGES, AND TRACK OBJECTS WITH PYTHON USING THE OPENCV LIBRARY OVERVIEW SET UP OPENCV, ITS PYTHON BINDINGS, AND OPTIONAL KINECT DRIVERS ON WINDOWS, MAC OR UBUNTU CREATE AN APPLICATION THAT TRACKS AND MANIPULATES FACES IDENTIFY FACE REGIONS USING NORMAL COLOR IMAGES AND DEPTH IMAGES IN DETAIL COMPUTER VISION CAN REACH CONSUMERS IN VARIOUS CONTEXTS VIA WEBCAMS, CAMERA PHONES AND GAMING SENSORS LIKE KINECT. OPENCV'S PYTHON BINDINGS CAN HELP DEVELOPERS MEET THESE CONSUMER DEMANDS FOR APPLICATIONS THAT CAPTURE IMAGES, CHANGE THEIR APPEARANCE AND EXTRACT INFORMATION FROM THEM, IN A HIGH-LEVEL LANGUAGE AND IN A STANDARDIZED DATA FORMAT THAT IS INTEROPERABLE WITH SCIENTIFIC LIBRARIES SUCH AS NUMPY AND SCIPY. "OPENCV COMPUTER VISION WITH PYTHON" IS A PRACTICAL, HANDS-ON GUIDE THAT COVERS THE FUNDAMENTAL TASKS OF COMPUTER VISION-CAPTURING, FILTERING AND ANALYZING IMAGES-WITH STEP-BY-STEP INSTRUCTIONS FOR WRITING BOTH AN APPLICATION AND REUSABLE LIBRARY CLASSES. "OPENCV COMPUTER VISION WITH PYTHON" SHOWS YOU HOW TO USE THE PYTHON BINDINGS FOR OPENCV. BY FOLLOWING CLEAR AND CONCISE EXAMPLES YOU WILL DEVELOP A COMPUTER VISION APPLICATION THAT TRACKS FACES IN LIVE VIDEO AND APPLIES SPECIAL EFFECTS TO THEM. IF YOU HAVE ALWAYS WANTED TO LEARN WHICH VERSION OF THESE BINDINGS TO USE, HOW TO INTEGRATE WITH CROSS-PLATFORM KINECT DRIVERS AND AND HOW TO EFFICIENTLY PROCESS IMAGE DATA WITH NUMPY AND SCIPY THEN THIS BOOK IS FOR YOU. WHAT YOU WILL LEARN FROM THIS BOOK INSTALL OPENCV AND RELATED SOFTWARE SUCH AS PYTHON, NUMPY, SCIPY, OPENNI, AND SENSOR KINECT-ALL ON WINDOWS, MAC OR UBUNTU CAPTURE, DISPLAY, AND SAVE PHOTOS AND REAL-TIME VIDEOS HANDLE WINDOW EVENTS AND INPUT EVENTS USING OPENCV'S HIGHGUI MODULE OR PYGAME UNDERSTAND OPENCV'S IMAGE FORMAT AND HOW TO PERFORM EFFICIENT OPERATIONS ON OPENCV IMAGES WITH NUMPY AND SCIPY APPLY "CURVES" AND OTHER COLOR TRANSFORMATIONS TO SIMULATE THE LOOK OF OLD PHOTOS, MOVIES OR VIDEO GAMES APPLY AN EFFECT ONLY TO EDGES IN AN IMAGE COPY AND RESIZE SEGMENTS OF AN IMAGE APPLY AN EFFECT ONLY TO CERTAIN DEPTHS IN AN IMAGE BY USING DATA FROM A DEPTH SENSOR SUCH AS KINECT TRACK FACES, EYES, NOSES AND MOUTHS BY USING PREBUILT DATASETS TRACK ARBITRARY OBJECTS BY CREATING ORIGINAL DATASETS APPROACH A PRACTICAL, PROJECT-BASED TUTORIAL FOR PYTHON DEVELOPERS AND HOBBYISTS WHO WANT TO GET STARTED WITH COMPUTER VISION WITH OPENCV AND PYTHON. WHO THIS BOOK IS WRITTEN FOR OPENCV COMPUTER VISION WITH PYTHON IS WRITTEN FOR PYTHON DEVELOPERS WHO ARE NEW TO COMPUTER VISION AND WANT A PRACTICAL GUIDE TO TEACH THEM THE ESSENTIALS. SOME UNDERSTANDING OF IMAGE DATA (FOR EXAMPLE, PIXELS AND COLOR CHANNELS) WOULD BE BENEFICIAL. AT A MINIMUM YOU WILL NEED ACCESS TO AT LEAST ONE WEBCAM. CERTAIN EXERCISES REQUIRE ADDITIONAL HARDWARE LIKE A SECOND WEBCAM, A MICROSOFT KINECT OR AN OPENNI-COMPLIANT DEPTH SENSOR SUCH AS THE ASUS XTION PRO.

**LEARNING OPENCV** - GARY BRADSKI 2008-10-02

"THIS LIBRARY IS USEFUL FOR PRACTITIONERS, AND IS AN EXCELLENT TOOL FOR THOSE ENTERING THE FIELD: IT IS A SET OF COMPUTER VISION ALGORITHMS THAT WORK AS ADVERTISED." -WILLIAM T. FREEMAN, COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE LABORATORY, MASSACHUSETTS INSTITUTE OF TECHNOLOGY LEARNING OPENCV PUTS YOU IN THE MIDDLE OF THE RAPIDLY EXPANDING FIELD OF COMPUTER VISION. WRITTEN BY THE CREATORS OF THE FREE OPEN SOURCE OPENCV LIBRARY, THIS BOOK INTRODUCES YOU TO COMPUTER VISION AND DEMONSTRATES HOW YOU CAN QUICKLY BUILD APPLICATIONS THAT ENABLE COMPUTERS TO "SEE" AND MAKE DECISIONS BASED ON THAT DATA. COMPUTER VISION IS EVERYWHERE-IN SECURITY SYSTEMS, MANUFACTURING INSPECTION SYSTEMS, MEDICAL IMAGE ANALYSIS, UNMANNED AERIAL VEHICLES, AND MORE. IT STITCHES GOOGLE MAPS AND GOOGLE EARTH TOGETHER, CHECKS THE PIXELS ON LCD SCREENS, AND MAKES SURE THE STITCHES IN YOUR SHIRT ARE SEWN PROPERLY. OPENCV PROVIDES AN EASY-TO-USE COMPUTER VISION FRAMEWORK AND A COMPREHENSIVE LIBRARY WITH MORE THAN 500 FUNCTIONS THAT CAN RUN VISION CODE IN REAL TIME. LEARNING OPENCV WILL TEACH ANY DEVELOPER OR HOBBYIST TO USE THE FRAMEWORK QUICKLY WITH THE HELP OF HANDS-ON EXERCISES IN EACH CHAPTER. THIS BOOK INCLUDES: A THOROUGH INTRODUCTION TO OPENCV GETTING INPUT FROM CAMERAS TRANSFORMING IMAGES SEGMENTING IMAGES AND SHAPE MATCHING PATTERN RECOGNITION, INCLUDING FACE DETECTION TRACKING AND MOTION IN 2 AND 3 DIMENSIONS 3D RECONSTRUCTION FROM STEREO VISION MACHINE LEARNING ALGORITHMS GETTING MACHINES TO SEE IS A CHALLENGING BUT ENTERTAINING GOAL. WHETHER YOU WANT TO BUILD SIMPLE OR SOPHISTICATED VISION APPLICATIONS, LEARNING

OpenCV is the book you need to get started.

*Practical OpenCV - Samarth Brahmhatt 2013-11-19*

Practical OpenCV is a hands-on project book that shows you how to get the best results from OpenCV, the open-source computer vision library. Computer vision is key to technologies like object recognition, shape detection, and depth estimation. OpenCV is an open-source library with over 2500 algorithms that you can use to do all of these, as well as track moving objects, extract 3D models, and overlay augmented reality. It's used by major companies like Google (in its autonomous car), Intel, and Sony; and it is the backbone of the Robot Operating System's computer vision capability. In short, if you're working with computer vision at all, you need to know OpenCV. With Practical OpenCV, you'll be able to: Get OpenCV up and running on Windows or Linux. Use OpenCV to control the camera board and run vision algorithms on Raspberry Pi.

Understand what goes on behind the scenes in computer vision applications like object detection, image stitching, filtering, stereo vision, and more. Code complex computer vision projects for your class/hobby/robot/job, many of which can execute in real time on off-the-shelf processors. Combine different modules that you develop to create your own interactive computer vision app. What you'll learn the ins and outs of OpenCV programming on Windows and Linux

Transforming and filtering images Detecting corners, edges, lines, and circles in images and video Detecting pre-trained objects in images and video Making panoramas by stitching images together Getting depth information by using stereo cameras Basic machine learning techniques Bonus: Learn how to run OpenCV on Raspberry Pi Who this book is for This book is for programmers and makers with little or no previous exposure to computer vision. Some proficiency with C++ is required. Table of Contents Part 1: Getting comfortable Chapter 1: Introduction to Computer Vision and OpenCV Chapter 2: Setting up OpenCV on your computer Chapter 3: CV Bling - OpenCV inbuilt demos Chapter 4: Basic operations on images and GUI windows Part 2: Advanced computer vision problems and coding them in OpenCV Chapter 5: Image filtering Chapter 6: Shapes in images Chapter 7: Image segmentation and histograms Chapter 8: Basic machine learning and keypoint-based object detection Chapter 9: Affine and perspective transformations and their applications to image panoramas Chapter 10: 3D geometry and stereo vision Chapter 11: Embedded computer vision: Running OpenCV programs on the Raspberry Pi

*Learning OpenCV 3 - Adrian Kaehler 2016-12-14*

"This book provides a working guide to the C++ Open Source Computer Vision Library (OpenCV) version 3.x and gives a general background on the field of computer vision sufficient to help readers use OpenCV effectively."--Preface.

*OpenCV 4 with Python Blueprints - Dr. Mervin Gevorgyan 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 features Understand how to capture high-quality image data, detect and track objects, and process the actions of animals or humans Implement your learning in different areas of computer vision Explore advanced concepts in OpenCV such as machine learning, artificial neural network, and augmented reality Book 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 learn Generate real-time visual effects using 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 to track arbitrary objects of interest Reconstruct a 3D real-world scene using 2D camera motion and camera reprojection techniques Detect faces using a cascade classifier and identify emotions in human faces using multilayer perceptrons Classify, localize, and detect objects with deep neural networks Who 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.

*Machine Learning for OpenCV 4 - Aditya Sharma 2019-09-06*

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 features Gain insights into machine learning algorithms, and implement them using OpenCV 4 and scikit-learn Get up to speed with Intel OpenVINO and its integration with OpenCV 4 Implement high-performance machine learning models with helpful tips and best practices Book description OpenCV is an open source 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 learn Understand the core machine learning concepts for image processing Explore the theory behind machine learning and deep learning algorithm design Discover effective techniques to train your deep learning models Evaluate machine learning models to improve the performance of your models Integrate algorithms such as support vector machines and Bayes classifier in your computer vision applications Use OpenVINO with OpenCV 4 to speed up model inference Who 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.

*A Practical Introduction to Computer Vision with OpenCV - Kenneth Dawson-Howe 2014-03-20*

Explains the theory behind basic computer vision and provides a bridge from the theory to practical implementation using the industry standard OpenCV libraries Computer vision is a rapidly expanding area and it is becoming progressively easier for developers to make use of this field due to the ready availability of high quality libraries (such as OpenCV 2). This text is intended to facilitate the practical use of computer vision with the goal being to bridge the gap between the theory and the practical implementation of computer vision. The book will explain how to use the relevant OpenCV library routines and will be accompanied by a full working program including the code snippets from the text. This textbook is a heavily illustrated, practical introduction to an exciting field, the applications of which are becoming almost ubiquitous. We are now surrounded by cameras, for example cameras on computers & tablets/ cameras built into our mobile phones/ cameras in games consoles; 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 & camera models; 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 Computer Vision Application Programming Cookbook - Third Edition - Robert Laganiere 2016-12-30*

Over 100 recipes to help you build computer vision applications that make the most of the popular C library OpenCV 3 About this book \*Written to the latest, gold-standard specification of OpenCV 3 \*Master OpenCV, the open source library of the computer vision community \*Master fundamental concepts in computer vision and image processing \*Learn about the important classes and functions of OpenCV with complete working examples applied to real images Who this book is for OpenCV 3 Computer Vision Application Programming Cookbook Third Edition is appropriate for novice C++ programmers who want to learn how to use the OpenCV library to build computer vision applications. It is also suitable for professional software developers who wish to be introduced to the concepts of computer vision programming. It can also be used as a companion book for university-level computer vision courses. It constitutes an excellent reference for graduate students and researchers in image processing and computer vision. What you will learn \*Install and create a program using the OpenCV library \*Process an image by manipulating its pixels \*Analyze an image using histograms \*Segment images into homogenous regions and extract meaningful objects \*Apply image filters to enhance image content \*Exploit the image geometry in order to relay different views of a pictured scene \*Calibrate the camera from different image observations \*Detect faces and people in images using machine learning techniques In detail Making your applications see has never been easier with OpenCV. With it, you can teach your robot how to follow your cat, write a program to correctly identify the members of One Direction, or even help you find the right colors for your redecoration. OpenCV 3 Computer Vision Application Programming Cookbook Third Edition provides a complete introduction to the OpenCV library and explains how to build your first computer vision program. You will be presented with a variety of computer vision algorithms and exposed to important concepts in image and video analysis that will enable you to build your own computer vision applications. This book helps you to get started with the library, and shows you how to install and

DEPLOY THE OPENCV LIBRARY TO WRITE EFFECTIVE COMPUTER VISION APPLICATIONS FOLLOWING GOOD PROGRAMMING PRACTICES. YOU WILL LEARN HOW TO READ AND WRITE IMAGES AND MANIPULATE THEIR PIXELS. DIFFERENT TECHNIQUES FOR IMAGE ENHANCEMENT AND SHAPE ANALYSIS WILL BE PRESENTED. YOU WILL LEARN HOW TO DETECT SPECIFIC IMAGE FEATURES SUCH AS LINES, CIRCLES OR CORNERS. YOU WILL BE INTRODUCED TO THE CONCEPTS OF MATHEMATICAL MORPHOLOGY AND IMAGE FILTERING. THE MOST RECENT METHODS FOR IMAGE MATCHING AND OBJECT RECOGNITION ARE DESCRIBED, AND YOU'LL DISCOVER HOW TO PROCESS VIDEO FROM FILES OR CAMERAS, AS WELL AS HOW TO DETECT AND TRACK MOVING OBJECTS. TECHNIQUES TO ACHIEVE CAMERA CALIBRATION AND PERFORM MULTIPLE-VIEW ANALYSIS WILL ALSO BE EXPLAINED. FINALLY, YOU'LL ALSO GET ACQUAINTED WITH RECENT APPROACHES IN MACHINE LEARNING AND OBJECT CLASSIFICATION.

**OPENCV 3 COMPUTER VISION APPLICATION PROGRAMMING COOKBOOK** - ROBERT LAGANIERE 2017-02-09

RECIPES TO HELP YOU BUILD COMPUTER VISION APPLICATIONS THAT MAKE THE MOST OF THE POPULAR C++ LIBRARY OPENCV 3 ABOUT THIS BOOK WRITTEN TO THE LATEST, GOLD-STANDARD SPECIFICATION OF OPENCV 3 MASTER OPENCV, THE OPEN SOURCE LIBRARY OF THE COMPUTER VISION COMMUNITY MASTER FUNDAMENTAL CONCEPTS IN COMPUTER VISION AND IMAGE PROCESSING LEARN ABOUT THE IMPORTANT CLASSES AND FUNCTIONS OF OPENCV WITH COMPLETE WORKING EXAMPLES APPLIED TO REAL IMAGES WHO THIS BOOK IS FOR OPENCV 3 COMPUTER VISION APPLICATION PROGRAMMING COOKBOOK THIRD EDITION IS APPROPRIATE FOR NOVICE C++ PROGRAMMERS WHO WANT TO LEARN HOW TO USE THE OPENCV LIBRARY TO BUILD COMPUTER VISION APPLICATIONS. IT IS ALSO SUITABLE FOR PROFESSIONAL SOFTWARE DEVELOPERS WHO WISH TO BE INTRODUCED TO THE CONCEPTS OF COMPUTER VISION PROGRAMMING. IT CAN ALSO BE USED AS A COMPANION BOOK FOR UNIVERSITY-LEVEL COMPUTER VISION COURSES. IT CONSTITUTES AN EXCELLENT REFERENCE FOR GRADUATE STUDENTS AND RESEARCHERS IN IMAGE PROCESSING AND COMPUTER VISION. WHAT YOU WILL LEARN INSTALL AND CREATE A PROGRAM USING THE OPENCV LIBRARY PROCESS AN IMAGE BY MANIPULATING ITS PIXELS ANALYZE AN IMAGE USING HISTOGRAMS SEGMENT IMAGES INTO HOMOGENOUS REGIONS AND EXTRACT MEANINGFUL OBJECTS APPLY IMAGE FILTERS TO ENHANCE IMAGE CONTENT EXPLOIT THE IMAGE GEOMETRY IN ORDER TO RELAY DIFFERENT VIEWS OF A PICTURED SCENE CALIBRATE THE CAMERA FROM DIFFERENT IMAGE OBSERVATIONS DETECT PEOPLE AND OBJECTS IN IMAGES USING MACHINE LEARNING TECHNIQUES RECONSTRUCT A 3D SCENE FROM IMAGES IN DETAIL MAKING YOUR APPLICATIONS SEE HAS NEVER BEEN EASIER WITH OPENCV. WITH IT, YOU CAN TEACH YOUR ROBOT HOW TO FOLLOW YOUR CAT, WRITE A PROGRAM TO CORRECTLY IDENTIFY THE MEMBERS OF ONE DIRECTION, OR EVEN HELP YOU FIND THE RIGHT COLORS FOR YOUR REDECORATION. OPENCV 3 COMPUTER VISION APPLICATION PROGRAMMING COOKBOOK THIRD EDITION PROVIDES A COMPLETE INTRODUCTION TO THE OPENCV LIBRARY AND EXPLAINS HOW TO BUILD YOUR FIRST COMPUTER VISION PROGRAM. YOU WILL BE PRESENTED WITH A VARIETY OF COMPUTER VISION ALGORITHMS AND EXPOSED TO IMPORTANT CONCEPTS IN IMAGE AND VIDEO ANALYSIS THAT WILL ENABLE YOU TO BUILD YOUR OWN COMPUTER VISION APPLICATIONS. THIS BOOK HELPS YOU TO GET STARTED WITH THE LIBRARY, AND SHOWS YOU HOW TO INSTALL AND DEPLOY THE OPENCV LIBRARY TO WRITE EFFECTIVE COMPUTER VISION APPLICATIONS FOLLOWING GOOD PROGRAMMING PRACTICES. YOU WILL LEARN HOW TO READ AND WRITE IMAGES AND MANIPULATE THEIR PIXELS. DIFFERENT TECHNIQUES FOR IMAGE ENHANCEMENT AND SHAPE ANALYSIS WILL BE PRESENTED. YOU WILL LEARN HOW TO DETECT SPECIFIC IMAGE FEATURES SUCH AS LINES, CIRCLES OR CORNERS. YOU WILL BE INTRODUCED TO THE CONCEPTS OF MATHEMATICAL MORPHOLOGY AND IMAGE FILTERING. THE MOST RECENT METHODS FOR IMAGE MATCHING AND OBJECT RECOGNITION ARE DESCRIBED, AND YOU'LL DISCOVER HOW TO PROCESS VIDEO FROM FILES OR CAMERAS, AS WELL AS HOW TO DETECT AND TRACK MOVING OBJECTS. TECHNIQUES TO ACHIEVE CAMERA CALIBRATION AND PERFORM MULTIPLE-VIEW ANALYSIS WILL ALSO BE EXPLAINED. FINALLY, YOU'LL ALSO GET ACQUAINTED WITH RECENT APPROACHES IN MACHINE LEARNING AND OBJECT CLASSIFICATION. STYLE AND APPROACH THIS BOOK WILL ARM YOU WITH THE BASICS YOU NEED TO START WRITING WORLD-AWARE APPLICATIONS RIGHT FROM A PIXEL LEVEL ALL THE WAY THROUGH TO PROCESSING VIDEO SEQUENCES.

**OPENCV WITH PYTHON BLUEPRINTS** - MICHAEL BEYELER 2015-10-19

DESIGN AND DEVELOP ADVANCED COMPUTER VISION PROJECTS USING OPENCV WITH PYTHON ABOUT THIS BOOK PROGRAM ADVANCED COMPUTER VISION APPLICATIONS IN PYTHON USING DIFFERENT FEATURES OF THE OPENCV LIBRARY PRACTICAL END-TO-END PROJECT COVERING AN IMPORTANT COMPUTER VISION PROBLEM ALL PROJECTS IN THE BOOK INCLUDE A STEP-BY-STEP GUIDE TO CREATE COMPUTER VISION APPLICATIONS WHO THIS BOOK IS FOR THIS BOOK IS FOR INTERMEDIATE USERS OF OPENCV WHO AIM TO MASTER THEIR SKILLS BY DEVELOPING ADVANCED PRACTICAL APPLICATIONS. READERS ARE EXPECTED TO BE FAMILIAR WITH OPENCV'S CONCEPTS AND PYTHON LIBRARIES. BASIC KNOWLEDGE OF PYTHON PROGRAMMING IS EXPECTED AND ASSUMED. WHAT YOU WILL LEARN GENERATE REAL-TIME VISUAL EFFECTS USING DIFFERENT FILTERS AND IMAGE MANIPULATION TECHNIQUES SUCH AS DODGING AND BURNING RECOGNIZE HAND GESTURES IN REAL TIME AND PERFORM HAND-SHAPE ANALYSIS BASED ON THE OUTPUT OF A MICROSOFT KINECT SENSOR LEARN FEATURE EXTRACTION AND FEATURE MATCHING FOR TRACKING ARBITRARY OBJECTS OF INTEREST RECONSTRUCT A 3D REAL-WORLD SCENE FROM 2D CAMERA MOTION AND COMMON CAMERA REPROJECTION TECHNIQUES TRACK VISUALLY SALIENT OBJECTS BY SEARCHING FOR AND FOCUSING ON IMPORTANT REGIONS OF AN IMAGE DETECT FACES USING A CASCADE CLASSIFIER AND RECOGNIZE EMOTIONAL EXPRESSIONS IN HUMAN FACES USING MULTI-LAYER PECEPTRONS (MLPs) RECOGNIZE STREET SIGNS USING A MULTI-CLASS ADAPTATION OF SUPPORT VECTOR MACHINES (SVMs) STRENGTHEN YOUR OPENCV2 SKILLS AND LEARN HOW TO USE NEW OPENCV3 FEATURES IN DETAIL OPENCV IS A NATIVE CROSS PLATFORM C++ LIBRARY FOR COMPUTER VISION, MACHINE LEARNING, AND IMAGE PROCESSING. IT IS INCREASINGLY BEING ADOPTED IN PYTHON FOR DEVELOPMENT. OPENCV HAS C++/C, PYTHON, AND JAVA INTERFACES WITH SUPPORT FOR WINDOWS, LINUX, MAC, IOS, AND ANDROID. DEVELOPERS USING OPENCV BUILD APPLICATIONS TO PROCESS VISUAL DATA; THIS CAN INCLUDE LIVE STREAMING DATA FROM A DEVICE LIKE A CAMERA, SUCH AS PHOTOGRAPHS OR VIDEOS. OPENCV OFFERS EXTENSIVE LIBRARIES WITH OVER 500 FUNCTIONS THIS BOOK DEMONSTRATES HOW TO DEVELOP A SERIES OF INTERMEDIATE TO ADVANCED PROJECTS USING

OPENCV AND PYTHON, RATHER THAN TEACHING THE CORE CONCEPTS OF OPENCV IN THEORETICAL LESSONS. INSTEAD, THE WORKING PROJECTS DEVELOPED IN THIS BOOK TEACH THE READER HOW TO APPLY THEIR THEORETICAL KNOWLEDGE TO TOPICS SUCH AS IMAGE MANIPULATION, AUGMENTED REALITY, OBJECT TRACKING, 3D SCENE RECONSTRUCTION, STATISTICAL LEARNING, AND OBJECT CATEGORIZATION. BY THE END OF THIS BOOK, READERS WILL BE OPENCV EXPERTS WHOSE NEWLY GAINED EXPERIENCE ALLOWS THEM TO DEVELOP THEIR OWN ADVANCED COMPUTER VISION APPLICATIONS. STYLE AND APPROACH THIS BOOK COVERS INDEPENDENT HANDS-ON PROJECTS THAT TEACH IMPORTANT COMPUTER VISION CONCEPTS LIKE IMAGE PROCESSING AND MACHINE LEARNING FOR OPENCV WITH MULTIPLE EXAMPLES.

**LEARN COMPUTER VISION USING OPENCV** - SUNILA GOLLAPUDI 2019-04-26

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 FOR THOSE WHO HAVE A BASIC UNDERSTANDING OF MACHINE LEARNING AND PYTHON AND ARE LOOKING TO LEARN COMPUTER VISION AND ITS APPLICATIONS.

**OPENCV 3.0 COMPUTER VISION WITH JAVA** - DANIEL L. LIS 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 ~~FUNCTIONAL COMPUTER VISION PROJECTS FOUND IN MANY CLASSES THAT~~ ALLOW DEVELOPERS TO UNDERSTAND COMPUTER VISION PRINCIPLES AND RAPIDLY EXTEND OR CUSTOMIZE THE PROJECTS FOR THEIR NEEDS.

- DAVID MILLIN

ESCRIVANA 2019-03-26

DELVE INTO PRACTICAL COMPUTER VISION AND IMAGE PROCESSING PROJECTS AND GET UP TO SPEED WITH ADVANCED OBJECT DETECTION TECHNIQUES AND MACHINE LEARNING ALGORITHMS KEY FEATURES DISCOVER BEST PRACTICES FOR ENGINEERING AND MAINTAINING OPENCV PROJECTS EXPLORE IMPORTANT DEEP LEARNING TOOLS FOR IMAGE CLASSIFICATION UNDERSTAND BASIC IMAGE MATRIX FORMATS AND FILTERS BOOK DESCRIPTION OPENCV IS ONE OF THE BEST OPEN SOURCE LIBRARIES AVAILABLE AND CAN HELP YOU FOCUS ON CONSTRUCTING COMPLETE PROJECTS ON IMAGE PROCESSING, MOTION DETECTION, AND IMAGE SEGMENTATION. THIS LEARNING PATH IS YOUR GUIDE TO UNDERSTANDING OPENCV CONCEPTS AND ALGORITHMS THROUGH REAL-WORLD EXAMPLES AND ACTIVITIES. THROUGH VARIOUS PROJECTS, YOU'LL ALSO DISCOVER HOW TO USE COMPLEX COMPUTER VISION AND MACHINE LEARNING ALGORITHMS AND FACE DETECTION TO EXTRACT THE MAXIMUM AMOUNT OF INFORMATION FROM IMAGES AND VIDEOS. IN LATER CHAPTERS, YOU'LL LEARN TO ENHANCE YOUR VIDEOS AND IMAGES WITH OPTICAL FLOW ANALYSIS AND BACKGROUND SUBTRACTION. SECTIONS IN THE LEARNING PATH WILL HELP YOU GET TO GRIPS WITH TEXT SEGMENTATION AND RECOGNITION, IN ADDITION TO GUIDING YOU THROUGH THE BASICS OF THE NEW AND IMPROVED DEEP LEARNING MODULES. BY THE END OF THIS LEARNING PATH, YOU WILL HAVE MASTERED COMMONLY USED COMPUTER VISION TECHNIQUES TO BUILD OPENCV PROJECTS FROM SCRATCH. THIS LEARNING PATH INCLUDES CONTENT FROM THE FOLLOWING PACKT BOOKS: MASTERING OPENCV 4 - THIRD EDITION BY ROY SHILKROT AND DAVID MILLIN ESCRIVANA LEARN OPENCV 4 BY BUILDING PROJECTS - SECOND EDITION BY DAVID MILLIN ESCRIVANA, VINCIUS G. MENDONÇA, AND PRATEEK JOSHI WHAT YOU WILL LEARN STAY UP-TO-DATE WITH ALGORITHMIC DESIGN APPROACHES FOR COMPLEX COMPUTER VISION TASKS WORK WITH OPENCV'S MOST UP-TO-DATE API THROUGH VARIOUS PROJECTS UNDERSTAND 3D SCENE RECONSTRUCTION AND STRUCTURE FROM MOTION (SfM) STUDY CAMERA CALIBRATION AND OVERLAY AUGMENTED REALITY (AR) USING THE ARUCO MODULE CREATE CMAKE SCRIPTS TO COMPILE YOUR C++ APPLICATION EXPLORE SEGMENTATION AND FEATURE EXTRACTION TECHNIQUES REMOVE BACKGROUNDS FROM STATIC SCENES TO IDENTIFY MOVING OBJECTS FOR SURVEILLANCE WORK WITH NEW OPENCV FUNCTIONS TO DETECT AND RECOGNIZE TEXT WITH TESSERACT 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, THIS LEARNING PATH IS FOR YOU. PRIOR KNOWLEDGE OF C++ AND FAMILIARITY WITH MATHEMATICAL CONCEPTS WILL HELP YOU BETTER UNDERSTAND THE CONCEPTS IN THIS LEARNING PATH.