Raspberry Pi Computer Vision Programming

Eventually, you will certainly discover a further experience and capability by spending more cash. yet when? reach you give a positive response that you require to acquire those all needs taking into consideration having significantly cash? Why dont you try to acquire something basic in the beginning? Thats something that will lead you to understand even more on the subject of the globe, experience, some places, subsequently history, amusement, and a lot more?

It is your entirely own time to put it on reviewing habit. among guides you could enjoy now is **raspberry pi computer vision programming** below.

Python Programming with Raspberry Pi - Sai Yamanoor 2017-04-28
Become a master of Python programming using the small yet powerful Raspberry Pi Zero About This Book This is the first book on the market that teaches Python programming with Raspberry Pi Zero Develop exciting applications such as a mobile robot and home automation controller using Python This step-by-step guide helps you make the most out of Raspberry Pi Zero using Python programming Who This Book Is For This book is aimed at hobbyists and programmers who want to learn Python programming and develop applications using the Pi Zero. They should have basic familiarity with electronics. What You Will Learn Configure Raspberry Pi using Python Control loops to blink an LED using simple arithmetic operations Understand how interface sensors, actuators, and LED displays work Get to grips with every aspect of Python programming using practical examples Explore machine vision, data visualization, and scientific computations Build a mobile robot using the Raspberry Pi as the controller Build a voice-activated home automation controller In Detail Raspberry Pi Zero is a super-small and super-affordable product from Raspberry Pi that is packed with a plethora of features and has grabbed the notice of programmers, especially those who use Python. This step-by-step guide will get you developing practical applications in Python using a Raspberry Pi Zero. It will become a valuable resource as you learn the essential details of interfacing sensors and actuators to a Raspberry Pi, as well as acquiring and displaying data. You will get started by writing a Python program that blinks an LED at 1-second intervals. Then you will learn to write simple logic to execute tasks based upon sensor data (for example, to control a motor) and retrieve data from the web (such as to check e-mails to provide a visual alert). Finally, you will learn to build a home automation system with Python where different appliances are controlled using the Raspberry Pi. The examples discussed in each chapter of this book culminate in a project that help improve the quality of people's lives. Style and approach This will be a learning, step-by-step guide to teach Python programming using the famous Raspberry Pi Zero. The book is packed with practical examples at every step along with tips and tricks for the Raspberry Pi fans

Ti nyML - Pete Warden 2019-12-16
Deep learning networks are getting smaller. Much smaller. The Google Assistant team can detect words with a model just 14 kilobytes in size—small enough to run on a microcontroller. With this practical book you'll enter the field of TinyML, where deep learning and embedded systems combine to make astounding things possible with tiny devices. Pete Warden and Daniel Situnayake explain how you can train models small enough to fit into any environment. Ideal for software and hardware developers who want to build embedded systems using machine learning, this guide walks you through creating a series of TinyML projects, step-by-step. No machine learning or microcontroller experience is necessary. Build a speech recognizer, a camera that detects people, and a magic wand that responds to gestures Work with Arduino and ultra-low-power microcontrollers Learn the essentials of ML and how to train your own

models Train models to understand audio, image, and accelerometer data Explore TensorFlow Lite for Microcontrollers, Google's toolkit for TinyML Debug applications and provide safeguards for privacy and security Optimize latency, energy usage, and model and binary size

Beginning Artificial Intelligence with the Raspberry Pi - Donald J. Norris 2017-06-05

Gain a gentle introduction to the world of Artificial Intelligence (AI) using the Raspberry Pi as the computing platform. Most of the major AI topics will be explored, including expert systems, machine learning both shallow and deep, fuzzy logic control, and more! AI in action will be demonstrated using the Python language on the Raspberry Pi. The Prolog language will also be introduced and used to demonstrate fundamental AI concepts. In addition, the Wolfram language will be used as part of the deep machine learning demonstrations. A series of projects will walk you through how to implement AI concepts with the Raspberry Pi. Minimal expense is needed for the projects as only a few sensors and actuators will be required. Beginners and hobbyists can jump right in to creating AI projects with the Raspberry PI using this book. What You'll Learn What AI is and—as importantly—what it is not Inference and expert systems Machine learning both shallow and deep Fuzzy logic and how to apply to an actual control system When AI might be appropriate to include in a system Constraints and limitations of the Raspberry Pi AI implementation Who This Book Is For Hobbyists, makers, engineers involved in designing autonomous systems and wanting to gain an education in fundamental AI concepts, and non-technical readers who want to understand what AI is and how it might affect their lives.

Learning Python with Raspberry Pi - Alex Bradbury 2014-03-10

The must-have companion guide to the Raspberry Pi User Guide! Raspberry Pi chose Python as its teaching language of choice to encourage a new generation of programmers to learn how to program. This approachable book serves as an ideal resource for anyone wanting to use Raspberry Pi to learn to program and helps you get started with the Python programming language. Aimed at first-time developers with no prior programming language assumed, this beginner book gets you up and running. Covers variables, loops, and functions Addresses 3D graphics programming Walks you through programming Minecraft Zeroes in on Python for scripting Learning Python with Raspberry Pi proves itself to be a fantastic introduction to coding.

Learn Raspberry Pi Programming with Python Wolfram Donat 2014-05-08

Learn Raspberry Pi Programming with Python will show you how to program your nifty new $35 computer to make a web spider, a weather station, a media server, and more. You'll learn how to program in Python on your Raspberry Pi with hands-on examples and fun projects. Even if you're completely new to programming in general, you'll figure out how to create a home security system, an underwater photography system, an RC plane with a camera, and even a near-space weather balloon with a camera. You'll learn how to make a variety of fun and even useful projects, from a web bot to search and download files to a toy to drive your pets insane. You'll even learn how to use Pi with Arduino as well as Pi with Gertboard, an expansion board with an onboard ATmega microcontroller.

Raspberry Pi by Example - Ashwin Pajankar 2016-04-20

Start building amazing projects with the Raspberry Pi right out of the boxAbout This Book- Explore the vast range of opportunities provided by Raspberry Pi and other hardware components such as a webcam, the Pi camera, and sensors- Get hands-on experience with coding, networking, and hardware with the Raspberry Pi platform- Learn through ample screenshots that offer a play-by-play account of how to implement Raspberry-Pi-based real-life projectsWho This Book Is ForWhat's the best way to learn how to use your Raspberry Pi? By example! If you want something exciting to do whilst getting to grips with what your Pi can offer, this is the book for you. With both simple and complex projects, you'll create a wide variety of cool toys and functions with your Raspberry Pi - all with minimal coding experience necessary.What You Will Learn- Set up your Raspberry Pi and get it ready for some

interesting real-life projects- Work with images, videos, webcams, and the Pi camera and create amazing time-lapse videos- Explore the amazing world of Minecraft Pi- Get to know how to use PiGlow for GPIO programming- Interface your Pi with Grove Sensors and implement IoT applications- Build your own cluster with Raspberry Pi- Understand the networking and network programming fundamentalsIn DetailWant to put your Raspberry Pi through its paces right out of the box? This tutorial guide is designed to get you learning all the tricks of the Raspberry Pi through building complete, hands-on hardware projects. Speed through the basics and then dive right in to development!Discover that you can do almost anything with your Raspberry Pi with a taste of almost everything. Get started with Pi Gaming as you learn how to set up Minecraft, and then program your own game with the help of Pygame. Turn the Pi into your own home security system with complete guidance on setting up a webcam spy camera and OpenCV computer vision for image recognition capabilities. Get to grips with GPIO programming to make a Pi-based glowing LED system, build a complete functioning motion tracker, and more. Finally, get ready to tackle projects that push your Pi to its limits. Construct a complete Internet of Things home automation system with the Raspberry Pi to control your house via Twitter; turn your Pi into a super-computer through linking multiple boards into a cluster and then add in advanced network capabilities for super speedy processing!Style and approachThis step-by-step guide to building Raspberry-Pi-based projects is explained in a conversational and easy-to-follow style. Each topic is explained sequentially in the process of creating real-life projects, and detailed explanations of the basic and advanced features of various Python libraries are also included.

Raspberry Pi Cookbook - Simon Monk 2016-05-18

"The world of Raspberry Pi is evolving quickly, with many new interface boards and software libraries becoming available all the time. In this cookbook, prolific hacker and author Simon Monk provides more than 200 practical recipes for running this tiny low-cost computer with Linux, programming it with Python, and hooking up sensors, motors and other hardware--including Arduino. You'll also learn basic principles to help you use new technologies with Raspberry Pi as its ecosystem develops. Python and other code examples from the book are available on GitHub. This cookbook is ideal for programmers and hobbyists familiar with the Pi through resources such as Getting Started with Raspberry Pi (O'Reilly)."--

Raspberry Pi Image Processing Programming - Ashwin Pajankar 2022-08-02

Understand the concepts of image processing with Python 3 and create applications using Raspberry Pi 4. This book covers image processing with the latest release of Python 3, using Raspberry Pi OS and Raspberry Pi 4B with the 8 GB RAM model as the preferred computing platform. This second edition begins with the installation of Raspberry Pi OS on the latest model of Raspberry Pi and then introduces Python programming language, IDEs for Python, and digital image processing. It also illustrates the theoretical foundations of Image processing followed by advanced operations in image processing. You'll then review image processing with NumPy, and Matplotlib followed by transformations, interpolation, and measurements of images. Different types of filters such as Kernels convolution filters, low pass filters, high pass filters, and Fourier filters are discussed in a clear, methodical manner. Additionally, the book examines various image processing techniques such as Morphology, Thresholding, and Segmentation, followed by a chapter on live webcam input with OpenCV, an image processing library with Python. The book concludes with an appendix covering a new library for image processing with Python, pgmagik, followed by a few important tips and tricks relevant to RPi. What You'll Learn Get started with Raspberry Pi and Python Understand Image Processing with Pillow See how image processing is processed using Numpy and Matplotlib Use Pi camera and webcam Who This Book Is For Raspberry Pi and IoT enthusiasts, and Python and Open Source professionals

Programming Computer Vision with Python - Jan Erik Solem 2012-06-19

If you want a basic understanding of computer vision’s underlying theory and algorithms, this hands-on introduction is the ideal place to start.

You'll learn techniques for object recognition, 3D reconstruction, stereo imaging, augmented reality, and other computer vision applications as you follow clear examples written in Python. Programming Computer Vision with Python explains computer vision in broad terms that won't bog you down in theory. You get complete code samples with explanations on how to reproduce and build upon each example, along with exercises to help you apply what you've learned. This book is ideal for students, researchers, and enthusiasts with basic programming and standard mathematical skills. Learn techniques used in robot navigation, medical image analysis, and other computer vision applications Work with image mappings and transforms, such as texture warping and panorama creation Compute 3D reconstructions from several images of the same scene Organize images based on similarity or content, using clustering methods Build efficient image retrieval techniques to search for images based on visual content Use algorithms to classify image content and recognize objects Access the popular OpenCV library through a Python interface

Computer Vision for the Web - Foat Akhmadeev 2015-10-14

Unleash the power of the Computer Vision algorithms in JavaScript to develop vision-enabled web content About This Book Explore the exciting world of image processing, and face and gesture recognition, and implement them in your website Develop wonderful web projects to implement Computer Vision algorithms in an effective way A fast-paced guide to help you deal with real-world Computer Vision applications using JavaScript libraries Who This Book Is For If you have an interest in Computer Vision or wish to apply Computer Vision algorithms such as face, custom object, and gesture recognition for an online application, then this book is ideal for you. Prior understanding of the JavaScript language and core mathematical concepts is recommended. What You Will Learn Apply complex Computer Vision algorithms in your applications using JavaScript Put together different JavaScript libraries to discover objects in photos Get to grips with developing simple computer vision applications on your own Understand when and why you should use different computer vision methods Apply various image filters to images and videos Recognize and track many different objects, including face and face particles using powerful face recognition algorithms Explore ways to control your browser without touching the mouse or keyboard In Detail JavaScript is a dynamic and prototype-based programming language supported by every browser today. JavaScript libraries boast outstanding functionalities that enable you to furnish your own Computer Vision projects, making it easier to develop JavaScript–based applications, especially for web-centric technologies. It makes the implementation of Computer Vision algorithms easier as it supports scheme-based functional programming. This book will give you an insight into controlling your applications with gestures and head motion and readying them for the web. Packed with real-world tasks, it begins with a walkthrough of the basic concepts of Computer Vision that the JavaScript world offers us, and you'll implement various powerful algorithms in your own online application. Then, we move on to a comprehensive analysis of JavaScript functions and their applications. Furthermore, the book will show you how to implement filters and image segmentation, and use tracking.js and jsfeat libraries to convert your browser into Photoshop. Subjects such as object and custom detection, feature extraction, and object matching are covered to help you find an object in a photo. You will see how a complex object such as a face can be recognized by a browser as you move toward the end of the book. Finally, you will focus on algorithms to create a human interface. By the end of this book, you will be familiarized with the application of complex Computer Vision algorithms to develop your own applications, without spending much time learning sophisticated theory. Style and approach This book is an easy-to-follow project-based guide that throws you directly into the excitement of the Computer Vision theme. A "more in less" approach is followed by important concepts explained in a to-the-point, easy-to-understand manner.

Raspberry Pi Computer Vision Programming - Second Edition - Ashwin Pajankar 2020-06-29

Getting Started with Raspberry Pi Zero -

Richard Grimmett 2016-03-30
Get started with the smallest, cheapest, and highest-utility Pi ever—Raspberry Pi Zero About This Book Get started with Raspberry Pi Zero and put all of its exciting features to use Create fun games and programs with little or no programming experience Learn to use this super-tiny PC to control hardware and software for work, play, and everything else Who This Book Is For This book is for hobbyists and programmers who are taking their first steps toward using Raspberry Pi Zero. No programming experience is required, although some Python programming experience might be useful. What You Will Learn Understand how to initially download the operating system and set up Raspberry Pi Zero Find out how to control the GPIO pins of Raspberry Pi Zero to control LED circuits Get to grips with adding hardware to the GPIO to control more complex hardware such as motors Add USB control hardware to control a complex robot with 12 servos Include speech recognition so that projects can receive commands Enable the robot to communicate with the world around it by adding speech output Control the robot from a distance and see what the robot is seeing by adding wireless communication Discover how to build a Robotic hand and a Quadcopter In Detail Raspberry Pi Zero is half the size of Raspberry Pi A, only with twice the utility. At just three centimeters wide, it packs in every utility required for full-fledged computing tasks. This practical tutorial will help you quickly get up and running with Raspberry Pi Zero to control hardware and software and write simple programs and games. You will learn to build creative programs and exciting games with little or no programming experience. We cover all the features of Raspberry Pi Zero as you discover how to configure software and hardware, and control external devices. You will find out how to navigate your way in Raspbian, write simple Python scripts, and create simple DIY programs. Style and approach This is a practical and fun ?getting started? tutorial that will guide you through everything new that the Raspberry Pi has to offer.

Learn Raspberry Pi Programming with Python Wolfram Donat 2014-04-30
Learn Raspberry Pi Programming with Python will show you how to program your nifty new $35 computer to make a web spider, a weather station, a media server, and more. You'll learn how to program in Python on your Raspberry Pi with hands-on examples and fun projects. Even if you're completely new to programming in general, you'll figure out how to create a home security system, an underwater photography system, an RC plane with a camera, and even a near-space weather balloon with a camera. You'll learn how to make a variety of fun and even useful projects, from a web bot to search and download files to a toy to drive your pets insane. You'll even learn how to use Pi with Arduino as well as Pi with Gertboard, an expansion board with an onboard ATmega microcontroller. What you'll learn Raspberry Pi and electronics basics Quick intro to Linux Python basics to get you started on a set of projects How to make a variety of Pi and Python projects, including servers and gadgets with cameras How to use Pi with Arduino and Gertboard Who this book is for Readers who want to learn Python on a fun platform like the Pi and pick up some electronics skills along the way. No programming or Linux skill required, but a little experience with Linux will be helpful. Table of Contents 1. Introducing the Raspberry Pi 2. Linux by the Seat of Your Pants 3. Introducing Python 4. Electronics at 100mph 5. The WebBot 6. The Weather Station 7. The Media Server 8. The Home Security System 9. The Cat Toy 10. The Radio-controlled Airplane 11. The Weather Balloon 12. The Submersible 13. The Gertboard 14. The Raspberry Pi and the Arduino

The Raspberry Pi 3 Project Book - Steve McCarthy 2018-01-07
If you want to learn more about Raspberry Pi, this is the book for you! Boasting more than just the basics, this book will walk you through everything from setting up the Pi to building a smart TV. McCarhty begins by introducing the reader to OpenCV, which is the computer vision library used for the projects he describes throughout the book. He then outlines in detail how to program video cameras, how to create a GPS designated photo camera, and even link your Raspberry Pi to your Google Home to bring automation to your smart house. In this book you'll work through a series of projects that outline basic Raspberry Pi programming. The

projects in this book include: How to create a face detection app Creating a print server that is network accessible How to create a weather app Building your own Smart TV More! Perhaps just as important as the projects themselves, McCarthy's book guides the reader on what he or she should already know before starting any of the projects. His "prerequisites" section explains how a basic understanding of Raspberry Pi is important to executing his projects, and provides resources for the Raspberry Pi programmer-to-be. But this book doesn't just stop with prerequisites! It also includes a "Chapter 0" for very beginners. This chapter takes a step-by-step approach to setting up the Raspberry Pi, connecting devices, and more. Once you set up your Raspberry Pi you'll be off and running! This book explores achievable, functional projects that you can create with your Raspberry Pi, and introduces you to the endless possibilities of Raspberry Pi programming. Whether you're new to the world of Raspberry Pi or simply looking for some new projects to hone your programming skills, this book delivers something useful for any reader. More about Raspberry Pi 3: The Raspberry Pi 3 is a credit-card sized computer that was designed to teach basic computer programing to children. It's an affordable option for schools and families, costing around e20-e40 ($25-$35) per unit. This capable computer allows kids to explore the fundamentals of coding in classrooms and at home! The Raspberry Pi 3 also has quite a bit of functionality outside of the classroom. It can be used to improve home automation, as a low-cost energy monitoring system, and more. Programmers are constantly finding more uses for the Raspberry Pi, so now is a great time to learn how to work with that thing! This is the perfect book to enhance your knowledge and train your skills on Python and Node.js programming by developing fun projects. Grab your copy now!

Raspberry Pi Cookbook - Simon Monk 2013-12-10

The world of Raspberry Pi is evolving quickly, with many new interface boards and software libraries becoming available all the time. In this cookbook, prolific hacker and author Simon Monk provides more than 200 practical recipes for running this tiny low-cost computer with Linux, programming it with Python, and hooking up sensors, motors, and other hardware--including Arduino. Make sure to check out 10 of the over 60 video recipes for this book at: http://razzpisampler.oreilly.com/ You can purchase all recipes at:

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.

Beginning Robotics with Raspberry Pi and Arduino - Jeff Cicolani 2018-04-23

Learn how to use a Raspberry Pi in conjunction with an Arduino to build a basic robot with advanced capabilities. Getting started in robotics does not have to be difficult. This book is an insightful and rewarding introduction to robotics and a catalyst for further directed study. You'll be led step by step through the process of building a robot that uses the power of a Linux based computer paired with the simplicity of Arduino. You'll learn why the Raspberry Pi is a great choice for a robotics platform; its strengths as well as its shortcomings; how to overcome these limitations by implementing an Arduino; and the basics of the Python programming language as well as some of the more powerful features. With the Raspberry Pi you can give your project the power of a Linux computer, while Arduino makes interacting with sensors and motors very easy. These two boards are complimentary in their functions; where one falters the other performs admirably. The book also includes references to other great works to help further your growth in the exciting, and now accessible, field of smart robotics. As a bonus, the final chapter of the book demonstrates the real power of the Raspberry Pi by implementing a basic vision system. Using OpenCV and a standard USB web cam, you will build a robot that can chase a ball. What You'll Learn Install Raspbian, the operating system that drives the Raspberry Pi Drive motors through an I2C motor controller Read data through sensors attached to an Arduino Who This Book Is For Hobbyists and students looking for a rapid start in robotics. It assumes no technical background. Readers are guided to pursue the areas that interest them in more detail as they learn.

Introduction to IoT with Machine Learning and Image Processing using Raspberry Pi - Shrirang Ambaji Kulkarni 2020-08-16

Machine Learning a branch of Artificial Intelligence is influencing the society, industry and academia at large. The adaptability of Python programming language to Machine Learning has increased its popularity further. Another technology on the horizon is Internet of Things (IoT). The present book tries to address IoT, Python and Machine Learning along with a small introduction to Image Processing. If you are a novice programmer or have just started exploring IoT or Machine Learning with Python, then this book is for you. Features: Raspberry Pi as IoT is described along with the procedure for installation and configuration. A simple introduction to Python Programming Language along with its popular library packages like NumPy, Pandas, SciPy and Matplotlib are dealt in an exhaustive manner along with relevant examples. Machine Learning along with Python Scikit-Learn library is explained to audience with an emphasis on supervised learning and classification. Image processing on IoT is introduced to the audience who love to apply Machine Learning algorithms to Images The book follows hands-on approach and provide a huge collection of Python programs.

The Official Raspberry Pi Beginner's Guide - 2018-12-10

OpenCV 4 with Python Blueprints Dr. Menua 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.

Learn Robotics Programming Danny Staple 2018-11-29

Gain experience of building a next-generation collaboration robot Key Features Get up and running with the fundamentals of robotic programming Program a robot using Python and the Raspberry Pi 3 Learn to build a smart robot with interactive and AI-enabled behaviors Book Description We live in an age where the most difficult human tasks are now automated. Smart and intelligent robots, which will perform different tasks precisely and efficiently, are the requirement of the hour. A combination of Raspberry Pi and Python works perfectly when making these kinds of robots. Learn Robotics Programming starts by introducing you to the basic structure of a robot, along with how to plan, build, and program it. As you make your way through the book, you will gradually progress to adding different outputs and sensors, learning new building skills, and writing code for interesting behaviors with sensors. You'll also be able to update your robot, and set up web, phone, and Wi-Fi connectivity in order to control it. By the end of the book, you will have built a clever robot that can perform basic artificial intelligence (AI) operations. What you will learn Configure a Raspberry Pi for use in a robot Interface motors and sensors with a Raspberry Pi Implement code to make interesting and intelligent robot behaviors Understand the first steps in AI behavior such as speech recognition visual processing Control AI robots using Wi-Fi Plan the budget for requirements of robots while choosing parts Who this book is for Learn Robotics Programming is for programmers, developers, and enthusiasts interested in robotics and developing a fully functional robot. No major experience required just some programming knowledge would be sufficient.

Practical OpenCV - Samarth Brahmbhatt 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 ContentsPart 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

Raspberry Pi: Amazing Projects from Scratch - Ashwin Pajankar 2016-09-26

Explore the powers of Raspberry Pi and build your very own projects right out of the box About This Book From robotics to gaming, this Learning Path will unlock your creativity! Build your own impressive IoT projects to transform your home Featuring some of Packt's very best Raspberry Pi content, this Learning Path doesn't just get you to your destination – it opens up a whole horizon of possibilities! Who This Book Is For Want new ideas for your next Raspberry Pi project? Got one lying around gathering dust? This Learning Path gets you straight into the creative dirty work of programming and playing with your pi. Whether your new to Raspberry Pi, or an experienced maker, we think this Learning Path will inspire you and get your creative juices flowing! What You Will Learn Discover an aweome range of Raspberry Pi projects Bridge the gap between software and hardware through your Pi and find out how to make an operating system interact with cameras and other hardware Find out how to use your Raspberry Pi for gaming Secure your home with this tiny computer! Make science fiction a reality – build a walking robot In Detail Looking for inspiration for your next Raspberry Pi project? Not sure where to begin? This Learning Path is the perfect place to begin, providing you with an accessible yet comprehensive journey through Raspberry Pi. Following three modules, you'll soon be confident and prepared to get creative with your microcomputer. Raspberry Pi by Example is the first module in this Learning Path – and it does exactly what it says. It doesn't just teach, it shows you how to go and build some awesome Raspberry Pi projects immediately. Build and play your own games with the Pi, build a complete Internet of Things home automation system that controls your house through Twitter... let your imagination run wild! In the next module we'll look in more depth at building a home security system. You'll be using some of the skills you devoped through the first module, but apply them to something more intricate and impressive. Using a Linux based operating system as the foundations, you'll gradually build up an entire security infrastructure adding

cameras, remote controls, and even intrusion alerts! In the final module, we'll take you into the world of Raspberry Pi robotics. By the end of it, you'll have built a biped robot that can interact with its environment! 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: Raspberry Pi By Example by Ashwin Pajankar and Arush Kakkar Building a Home Security System with Raspberry Pi by Matthew Pole Raspberry Pi Robotics Essentials by Richard Grimmett Style and approach It's not every day you build a home automation system. It's not every day you build a walking robot. But with this Learning Path you'll do just that. So get started and let this tiny computer expand your imagination.

Mastering OpenCV 4 with Python - Alberto Fernández Villán 2019-03-29

Create advanced applications with Python and OpenCV, exploring the potential of facial recognition, machine learning, deep learning, web computing and augmented reality. Key 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.

Raspberry Pi Image Processing Programming Ashwin Pajankar 2017-03-22

Write your own Digital Image Processing programs with the use of pillow, scipy.ndimage, and matplotlib in Python 3 with Raspberry Pi 3 as the hardware platform. This concise quick-start guide provides working code examples and exercises. Learn how to interface Raspberry Pi with various image sensors. What You'll Learn Understand Raspberry Pi concepts and setup Understand digital image processing concepts Study pillow, the friendly PIL fork Explore scipy.ndimage and matplotlib Master use of the Pi camera and webcam Who This Book Is For Raspberry Pi and IoT enthusiasts, digital image processing enthusiasts, Python and Open Source enthusiasts and professionals

Learn Raspberry Pi Programming with Python - Wolfram Donat 2018-07-19

Learn how to program your nifty new $35 computer to make a web spider, a weather

station, a media server, and more. This book explores how to make a variety of fun and even useful projects, from a web bot to search and download files to a toy to drive your pets insane. Even if you're completely new to programming in general, you'll see how easy it is to create a home security system, an underwater photography system, an RC plane with a camera, and even a near-space weather balloon with a camera. You'll learn how to use Pi with Arduino as well as Pi with Gertboard, an expansion board with an onboard ATmega microcontroller. Learn Raspberry Pi Programming with Python has been fully updated in this new edition to cover the features of the new boards. You'll learn how to program in Python on your Raspberry Pi with hands-on examples and fun projects. What You'll Learn Set up your new Raspberry Pi Build unique projects across a range of interests Program basic functions and processes using Python Who This Book Is For Readers who want to learn Python on a fun platform like the Pi and pick up some electronics skills along the way. No programming or Linux skill required, but a little experience with Linux will be helpful. Readers familiar with the 1st edition will enjoy the updated information in this new edition.

Raspberry Pi By Example - Ashwin Pajankar 2016-04-22

Start building amazing projects with the Raspberry Pi right out of the box About This Book Explore the vast range of opportunities provided by Raspberry Pi and other hardware components such as a webcam, the Pi camera, and sensors Get hands-on experience with coding, networking, and hardware with the Raspberry Pi platform Learn through ample screenshots that offer a play-by-play account of how to implement Raspberry-Pi-based real-life projects Who This Book Is For What's the best way to learn how to use your Raspberry Pi? By example! If you want something exciting to do whilst getting to grips with what your Pi can offer, this is the book for you. With both simple and complex projects, you'll create a wide variety of cool toys and functions with your Raspberry Pi - all with minimal coding experience necessary. What You Will Learn Set up your Raspberry Pi and get it ready for some interesting real-life projects Work with images, videos, webcams, and the Pi camera and create amazing time-lapse videos Explore the amazing world of Minecraft Pi Get to know how to use PiGlow for GPIO programming Interface your Pi with Grove Sensors and implement IoT applications Build your own cluster with Raspberry Pi Understand the networking and network programming fundamentals In Detail Want to put your Raspberry Pi through its paces right out of the box? This tutorial guide is designed to get you learning all the tricks of the Raspberry Pi through building complete, hands-on hardware projects. Speed through the basics and then dive right in to development! Discover that you can do almost anything with your Raspberry Pi with a taste of almost everything. Get started with Pi Gaming as you learn how to set up Minecraft, and then program your own game with the help of Pygame. Turn the Pi into your own home security system with complete guidance on setting up a webcam spy camera and OpenCV computer vision for image recognition capabilities. Get to grips with GPIO programming to make a Pi-based glowing LED system, build a complete functioning motion tracker, and more. Finally, get ready to tackle projects that push your Pi to its limits. Construct a complete Internet of Things home automation system with the Raspberry Pi to control your house via Twitter; turn your Pi into a super-computer through linking multiple boards into a cluster and then add in advanced network capabilities for super speedy processing! Style and approach This step-by-step guide to building Raspberry-Pi-based projects is explained in a conversational and easy-to-follow style. Each topic is explained sequentially in the process of creating real-life projects, and detailed explanations of the basic and advanced features of various Python libraries are also included.

Raspberry Pi Computer Vision Programming - Ashwin Pajankar 2015-05-28

This book is intended for novices, as well as seasoned Raspberry Pi and Python enthusiasts, who would like to explore the area of computer vision. Readers with very little programming or coding/scripting experience can create wonderful image processing and computer vision applications with relatively fewer lines of code in Python.

Learn Robotics Programming - Danny Staple 2021-02-12

Develop an extendable smart robot capable of performing a complex series of actions with Python and Raspberry Pi Key FeaturesGet up to speed with the fundamentals of robotic programming and build intelligent robotsLearn how to program a voice agent to control and interact with your robot's behaviorEnable your robot to see its environment and avoid barriers using sensorsBook Description We live in an age where the most complex or repetitive tasks are automated. Smart robots have the potential to revolutionize how we perform all kinds of tasks with high accuracy and efficiency. With this second edition of Learn Robotics Programming, you'll see how a combination of the Raspberry Pi and Python can be a great starting point for robot programming. The book starts by introducing you to the basic structure of a robot and shows you how to design, build, and program it. As you make your way through the book, you'll add different outputs and sensors, learn robot building skills, and write code to add autonomous behavior using sensors and a camera. You'll also be able to upgrade your robot with Wi-Fi connectivity to control it using a smartphone. Finally, you'll understand how you can apply the skills that you've learned to visualize, lay out, build, and code your future robot building projects. By the end of this book, you'll have built an interesting robot that can perform basic artificial intelligence operations and be well versed in programming robots and creating complex robotics projects using what you've learned. What you will learnLeverage the features of the Raspberry Pi OSDiscover how to configure a Raspberry Pi to build an AI-enabled robotInterface motors and sensors with a Raspberry PiCode your robot to develop engaging and intelligent robot behaviorExplore AI behavior such as speech recognition and visual processingFind out how you can control AI robots with a mobile phone over Wi-FiUnderstand how to choose the right parts and assemble your robotWho this book is for This second edition of Learn Robotics Programming is for programmers, developers, and robotics enthusiasts who want to develop a fully functional robot and leverage AI to build interactive robots. Basic knowledge of the Python programming language will help you understand the concepts covered in this robot programming book more effectively.

Python Game Programming By Example - Alejandro Rodas de Paz 2015-09-28

A pragmatic guide for developing your own games with Python About This Book Strengthen your fundamentals of game programming with Python language Seven hands-on games to create 2D and 3D games rapidly from scratch Illustrative guide to explore the different GUI libraries for building your games Who This Book Is For If you have ever wanted to create casual games in Python and you would like to explore various GUI technologies that this language offers, this is the book for you. This title is intended for beginners to Python with little or no knowledge of game development, and it covers step by step how to build seven different games, from the well-known Space Invaders to a classical 3D platformer. What You Will Learn Take advantage of Python's clean syntax to build games quickly Discover distinct frameworks for developing graphical applications Implement non-player characters (NPCs) with autonomous and seemingly intelligent behaviors Design and code some popular games like Pong and tower defense Compose maps and levels for your sprite-based games in an easy manner Modularize and apply object-oriented principles during the design of your games Exploit libraries like Chimpunk2D, cocos2d, and Tkinter Create natural user interfaces (NUIs), using a camera and computer vision algorithms to interpret the player's real-world actions In Detail With a growing interest in learning to program, game development is an appealing topic for getting started with coding. From geometry to basic Artificial Intelligence algorithms, there are plenty of concepts that can be applied in almost every game. Python is a widely used general-purpose, high-level programming language. It provides constructs intended to enable clear programs on both a small and large scale. It is the third most popular language whose grammatical syntax is not predominantly based on C. Python is also very easy to code and is also highly flexible, which is exactly what is required for game development. The user-friendliness of this language allows beginners to code games without too much effort or training. Python also works with very little code and in most cases uses the “use cases” approach, reserving lengthy

explicit coding for outliers and exceptions, making game development an achievable feat. Python Game Programming by Example enables readers to develop cool and popular games in Python without having in-depth programming knowledge of Python. The book includes seven hands-on projects developed with several well-known Python packages, as well as a comprehensive explanation about the theory and design of each game. It will teach readers about the techniques of game design and coding of some popular games like Pong and tower defense. Thereafter, it will allow readers to add levels of complexities to make the games more fun and realistic using 3D. At the end of the book, you will have added several GUI libraries like Chimpunk2D, cocos2d, and Tkinter in your tool belt, as well as a handful of recipes and algorithms for developing games with Python. Style and approach This book is an example-based guide that will teach you to build games using Python. This book follows a step-by-step approach as it is aimed at beginners who would like to get started with basic game development. By the end of this book you will be competent game developers with good knowledge of programming in Python.

Raspberry Pi Computer Vision Programming Ashwin Pajankar 2020-06-29

Perform a wide variety of computer vision tasks such as image processing and manipulation, feature and object detection, and image restoration to build real-life computer vision applications Key FeaturesExplore the potential of computer vision with Raspberry Pi and Python programmingPerform computer vision tasks such as image processing and manipulation using OpenCV and Raspberry PiDiscover easy-to-follow examples and screenshots to implement popular computer vision techniques and applicationsBook Description Raspberry Pi is one of the popular single-board computers of our generation. All the major image processing and computer vision algorithms and operations can be implemented easily with OpenCV on Raspberry Pi. This updated second edition is packed with cutting-edge examples and new topics, and covers the latest versions of key technologies such as Python 3, Raspberry Pi, and OpenCV. This book will equip you with the skills required to successfully design and implement your own OpenCV, Raspberry Pi, and Python-based computer vision projects. At the start, you'll learn the basics of Python 3, and the fundamentals of single-board computers and NumPy. Next, you'll discover how to install OpenCV 4 for Python 3 on Raspberry Pi, before covering major techniques and algorithms in image processing, manipulation, and computer vision. By working through the steps in each chapter, you'll understand essential OpenCV features. Later sections will take you through creating graphical user interface (GUI) apps with GPIO and OpenCV. You'll also learn to use the new computer vision library, Mahotas, to perform various image processing operations. Finally, you'll explore the Jupyter Notebook and how to set up a Windows computer and Ubuntu for computer vision. By the end of this book, you'll be able to confidently build and deploy computer vision apps. What you will learnSet up a Raspberry Pi for computer vision applicationsPerform basic image processing with libraries such as NumPy, Matplotlib, and OpenCVDemonstrate arithmetical, logical, and other operations on imagesWork with a USB webcam and the Raspberry Pi Camera ModuleImplement low-pass and high-pass filters and understand their applications in image processingCover advanced techniques such as histogram equalization and morphological transformationsCreate GUI apps with Python 3 and OpenCVPerform machine learning with K-means clustering and image quantizationWho this book is for This book is for beginners as well as experienced Raspberry Pi and Python 3 enthusiasts who are looking to explore the amazing world of computer vision. Working knowledge of the Python 3 programming language is assumed.

Artificial Vision and Language Processing for Robotics - Álvaro Morena Alberola 2019-04-30

Create end-to-end systems that can power robots with artificial vision and deep learning techniques Key FeaturesStudy ROS, the main development framework for robotics, in detailLearn all about convolutional neural networks, recurrent neural networks, and roboticsCreate a chatbot to interact with the robotBook Description Artificial Vision and Language Processing for Robotics begins by

discussing the theory behind robots. You'll compare different methods used to work with robots and explore computer vision, its algorithms, and limits. You'll then learn how to control the robot with natural language processing commands. You'll study Word2Vec and GloVe embedding techniques, non-numeric data, recurrent neural network (RNNs), and their advanced models. You'll create a simple Word2Vec model with Keras, as well as build a convolutional neural network (CNN) and improve it with data augmentation and transfer learning. You'll study the ROS and build a conversational agent to manage your robot. You'll also integrate your agent with the ROS and convert an image to text and text to speech. You'll learn to build an object recognition system using a video. By the end of this book, you'll have the skills you need to build a functional application that can integrate with a ROS to extract useful information about your environment. What you will learnExplore the ROS and build a basic robotic systemUnderstand the architecture of neural networksIdentify conversation intents with NLP techniquesLearn and use the embedding with Word2Vec and GloVeBuild a basic CNN and improve it using generative modelsUse deep learning to implement artificial intelligence(AI)and object recognitionDevelop a simple object recognition system using CNNsIntegrate AI with ROS to enable your robot to recognize objectsWho this book is for Artificial Vision and Language Processing for Robotics is for robotics engineers who want to learn how to integrate computer vision and deep learning techniques to create complete robotic systems. It will prove beneficial to you if you have working knowledge of Python and a background in deep learning. Knowledge of the ROS is a plus.

Arduino Computer Vision Programming Ozen Ozkaya 2015-08-24

Design and develop real-world computer vision applications with the powerful combination of OpenCV and ArduinoAbout This Book- Load and run the applications in Arduino to develop intelligent systems- Design and implement detection, classification, and recognition algorithms for computer vision applications- Explore the best practices of computer vision development including state of the art algorithms and hands-on example projectsWho This Book Is ForIf you are a consumer and hobbyist who has familiarity with the basics of Arduino and wish to learn computer vision programming with Arduino to create intelligent systems, then this book is for you. No knowledge of computer vision programming is required.What You Will Learn- Understand the design blocks and the generic architecture of computer vision systems by learning an efficient approach to modelling- Build up your skill set of computer vision system design using OpenCV by learning fundamentals, camera selection, data acquisition, filtering, processing, feature extraction and recognition for any specific problem- Learn the wired and wireless communication capabilities of Arduino and comprehensive best practices to connect it to the OpenCV environment in a platform-independent way- Discover how to use Arduino to elegantly interact with real life via physical actions- Solidify everything you've learnt by designing and building a computer vision-enabled practical robot from scratchIn detailsMost technologies are developed with an inspiration of human capabilities. Most of the time, the hardest to implement capability is vision. Development of highly capable computer vision applications in an easy way requires a generic approach. In this approach, Arduino is a perfect tool for interaction with the real world. Moreover, the combination of OpenCV and Arduino boosts the level and quality of practical computer vision applications.Computer vision is the next level of sensing the environment. The purpose of this book is to teach you how to develop Arduino-supported computer vision systems that can interact with real life by seeing it.This book will combine the powers of Arduino and computer vision in a generalized, well-defined, and applicable way. The practices and approaches in the book can be used for any related problems and on any platforms. At the end of the book, you should be able to solve any types of real life vision problems with all its components by using the presented approach. Each component will extend your vision with the best practices on the topic.In each chapter, you will find interesting real life practical application examples about the topics in the chapter. To make it grounded, we will build a vision-enabled

robot step by step towards the end of the book. You will observe that, even though the contexts of the problems are very different, the approaches to solve them are the same and very easy!Style and approachThis book is a step-by-step guide that explains each topic sequentially by using best practices and useful tips to build computer-vision applications with OpenCV and Arduino. All the information in the book is combined in a real life all-in-one example application.

Machine Learning with the Raspberry Pi - Donald J. Norris 2019-11-29

Using the Pi Camera and a Raspberry Pi board, expand and replicate interesting machine learning (ML) experiments. This book provides a solid overview of ML and a myriad of underlying topics to further explore. Non-technical discussions temper complex technical explanations to make the hottest and most complex topic in the hobbyist world of computing understandable and approachable. Machine learning, also commonly referred to as deep learning (DL), is currently being integrated into a multitude of commercial products as well as widely being used in industrial, medical, and military applications. It is hard to find any modern human activity, which has not been "touched" by artificial intelligence (AI) applications. Building on the concepts first presented in Beginning Artificial Intelligence with the Raspberry Pi, you'll go beyond simply understanding the concepts of AI into working with real machine learning experiments and applying practical deep learning concepts to experiments with the Pi board and computer vision. What you learn with Machine Learning with the Raspberry Pi can then be moved on to other platforms to go even further in the world of AI and ML to better your hobbyist or commercial projects. What You'll Learn Acquire a working knowledge of current ML Use the Raspberry Pi to implement ML techniques and algorithms Apply AI and ML tools and techniques to your own work projects and studies Who This Book Is For Engineers and scientists but also experienced makers and hobbyists. Motivated high school students who desire to learn about ML can benefit from this material with determination.

Raspberry Pi Cookbook for Python Programmers - Tim Cox 2014-04-16

Raspberry Pi Cookbook for Python Programmers is written in a Cookbook format, presenting examples in the style of recipes.This allows you to go directly to your topic of interest, or follow topics throughout a chapter to gain a thorough in-depth knowledge. The aim of this book is to bring you a broad range of Python 3 examples and practical ideas which you can develop to suit your own requirements. By modifying and combining the examples to create your own projects you learn far more effectively with a much greater understanding. Each chapter is designed to become a foundation for further experimentation and discovery of the topic, providing you with the tools and information to jump right in. Readers are expected to be familiar with programming concepts and Python (where possible Python 3 is used), although beginners should manage with the help of a good Python reference book and background reading. No prior knowledge of the Raspberry Pi or electronics is required; however for the hardware sections you will need some basic electronic components/household tools to build some of the projects.

Raspberry Pi Supercomputing and Scientific Programming - Ashwin Pajankar 2017-05-25

Build an inexpensive cluster of multiple Raspberry Pi computers and install all the required libraries to write parallel and scientific programs in Python 3. This book covers setting up your Raspberry Pis, installing the necessary software, and making a cluster of multiple Pis. Once the cluster is built, its power has to be exploited by means of programs to run on it. So, Raspberry Pi Supercomputing and Scientific Programming teaches you to code the cluster with the MPI4PY library of Python 3. Along the way, you will learn the concepts of the Message Passing Interface (MPI) standards and will explore the fundamentals of parallel programming on your inexpensive cluster. This will make this book a great starting point for supercomputing enthusiasts who want to get started with parallel programming. The book finishes with details of symbolic mathematics and scientific and numerical programming in Python, using SymPi, SciPy, NumPy, and Matplotlib. You'll see how to process signals and images, carry out calculations using linear

algebra, and visualize your results, all using Python code. With the power of a Raspberry Pi supercomputer at your fingertips, data-intensive scientific programming becomes a reality at home. What You Will Learn Discover the essentials of supercomputing Build a low-cost cluster of Raspberry Pis at home Harness the power of parallel programming and the Message Passing Interface (MPI) Use your Raspberry Pi for symbolic, numerical, and scientific programming Who This Book Is For Python 3 developers who seek the knowledge of parallel programming, Raspberry Pi enthusiasts, researchers, and the scientific Python community.

Practical Deep Learning for Cloud, Mobile, and Edge - Anirudh Koul 2019-10-14

Whether you're a software engineer aspiring to enter the world of deep learning, a veteran data scientist, or a hobbyist with a simple dream of making the next viral AI app, you might have wondered where to begin. This step-by-step guide teaches you how to build practical deep learning applications for the cloud, mobile, browsers, and edge devices using a hands-on approach. Relying on years of industry experience transforming deep learning research into award-winning applications, Anirudh Koul, Siddha Ganju, and Meher Kasam guide you through the process of converting an idea into something that people in the real world can use. Train, tune, and deploy computer vision models with Keras, TensorFlow, Core ML, and TensorFlow Lite Develop AI for a range of devices including Raspberry Pi, Jetson Nano, and Google Coral Explore fun projects, from Silicon Valley's Not Hotdog app to 40+ industry case studies Simulate an autonomous car in a video game environment and build a miniature version with reinforcement learning Use transfer learning to train models in minutes Discover 50+ practical tips for maximizing model accuracy and speed, debugging, and scaling to millions of users

Exploring Raspberry Pi - Derek Molloy 2016-06-09

Expand Raspberry Pi capabilities with fundamental engineering principles Exploring Raspberry Pi is the innovators guide to bringing Raspberry Pi to life. This book favors engineering principles over a 'recipe' approach to give you the skills you need to design and build your own projects. You'll understand the fundamental principles in a way that transfers to any type of electronics, electronic modules, or external peripherals, using a "learning by doing" approach that caters to both beginners and experts. The book begins with basic Linux and programming skills, and helps you stock your inventory with common parts and supplies. Next, you'll learn how to make parts work together to achieve the goals of your project, no matter what type of components you use. The companion website provides a full repository that structures all of the code and scripts, along with links to video tutorials and supplementary content that takes you deeper into your project. The Raspberry Pi's most famous feature is its adaptability. It can be used for thousands of electronic applications, and using the Linux OS expands the functionality even more. This book helps you get the most from your Raspberry Pi, but it also gives you the fundamental engineering skills you need to incorporate any electronics into any project. Develop the Linux and programming skills you need to build basic applications Build your inventory of parts so you can always "make it work" Understand interfacing, controlling, and communicating with almost any component Explore advanced applications with video, audio, real-world interactions, and more Be free to adapt and create with Exploring Raspberry Pi.

Practical Computer Vision with SimpleCV - Kurt Demaagd 2012

SimpleCV is a cross platform (Windows, Macintosh, Linux) framework in Python that makes writing computer vision applications quick and easy.

Learn Robotics with Raspberry Pi - Matt Timmons-Brown 2019-01-22

In Learn Robotics with Raspberry Pi, you'll learn how to build and code your own robot projects with just the Raspberry Pi microcomputer and a few easy-to-get components - no prior experience necessary! Learn Robotics with Raspberry Pi will take you from inexperienced maker to robot builder. You'll start off building a two-wheeled robot powered by a Raspberry Pi minicomputer and then program it using Python, the world's most popular programming language. Gradually, you'll improve your robot

by adding increasingly advanced functionality until it can follow lines, avoid obstacles, and even recognize objects of a certain size and color using computer vision. Learn how to: - Control your robot remotely using only a Wii remote - Teach your robot to use sensors to avoid obstacles - Program your robot to follow a line autonomously - Customize your robot with LEDs and speakers to make it light up and play sounds - See what your robot sees with a Pi Camera As you work through the book, you'll learn fundamental electronics skills like how to wire up parts, use resistors and regulators, and determine how much power your robot needs. By the end, you'll have learned the basics of coding in Python and know enough about working with hardware like LEDs, motors, and sensors to expand your creations beyond simple robots.