

Learn Robotics Programming Build And Control Autonomous Robots Using Raspberry Pi 3 And Python

Learn Robotics Programming

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Learn Robotics with Raspberry Pi

Beginning Robotics with Raspberry Pi and Arduino

Practical Robotics in C++

Robotics at Home with Raspberry Pi Pico

Programming Robots with ROS

Learning Robotics Using Python

Python Robotics Projects

Robot Operating System (ROS) for Absolute Beginners

Mastering ROS for Robotics Programming

Hands-On Robotics Programming with C++

Learn Robotics with Raspberry Pi

Beginning Artificial Intelligence with the Raspberry Pi

ROS Robotics Projects

Getting Started with Raspberry Pi Zero

Hands-On ROS for Robotics Programming

Learning ROS for Robotics Programming

Make a Raspberry Pi-Controlled Robot

Robotics

Artificial Intelligence for Robotics

Robot Programming

Practical Python Programming for IoT

Build and Code Creative Robots with LEGO BOOST

Embedded Robotics

A Systematic Approach to Learning Robot Programming with ROS

Getting Started with Raspberry Pi

Programming the Raspberry Pi: Getting Started with Python

Robot Building for Beginners, Third Edition

PiBot

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Learn Robotics Programming Build And Control Autonomous Robots Using Raspberry Pi 3 And Python Descriptions

Learn Robotics Programming Build And Control Autonomous Robots Using Raspberry Pi 3 And Python Books

What is the Learn Robotics Programming Build And Control Autonomous Robots Using Raspberry Pi 3 And Python?

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2018-08-30 Francis X. Govers Bring a new degree of interconnectivity to your world by building your own intelligent robots Key Features Leverage fundamentals of AI and robotics Work through use cases to implement various machine learning algorithms Explore Natural Language Processing (NLP) concepts for efficient decision making in robots Book Description Artificial Intelligence for Robotics starts with an introduction to Robot Operating Systems (ROS), Python, robotic fundamentals, and the software and tools that are required to start out with robotics. You will learn robotics concepts that will be useful for making decisions, along with basic navigation skills. As you make your way through the chapters, you will learn about object recognition and genetic algorithms, which will teach your robot to identify and pick up an irregular object. With plenty of use cases throughout, you will explore natural language processing (NLP) and machine learning techniques to further enhance your robot. In the concluding chapters, you will learn about path planning and goal-oriented programming, which will help your robot prioritize tasks. By the end of this book, you will have learned to give your robot an artificial personality using simulated intelligence. What you will learn Get started with robotics and artificial intelligence Apply simulation techniques to give your robot an artificial personality Understand object recognition using neural networks and supervised learning techniques Pick up objects using genetic algorithms for manipulation Teach your robot to listen using NLP via an expert system Use machine learning and computer vision to teach your robot how to avoid obstacles Understand path planning, decision trees, and search algorithms in order to enhance your robot Who this book is for If you have basic knowledge about robotics and want to build or enhance your existing robot's intelligence, then Artificial Intelligence for Robotics is for you. This book is also for enthusiasts who want to gain knowledge of AI and robotics.

2016-03-30 Richard Grimmer 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.

2008-09-20 Thomas Bräunl This book presents a unique examination of mobile robots and embedded systems, from introductory to intermediate level. It is structured in three parts, dealing with Embedded Systems (hardware and software design, actuators, sensors, PID control, multitasking), Mobile Robot Design (driving, balancing, walking, and flying robots), and Mobile Robot Applications (mapping, robot soccer, genetic algorithms, neural networks, behavior-based systems, and simulation). The book is written as a text for courses in computer science, computer engineering, IT, electronic engineering, and mechatronics, as well as a guide for robot hobbyists and researchers.

2020-11-12 Gary Smart Leverage Python and Raspberry Pi to create complex IoT applications capable of creating and detecting movement and measuring distance, light, and a host of other environmental conditions Key Features Learn the fundamentals of electronics and how to integrate them with a Raspberry Pi Understand how to build RESTful APIs, WebSocket APIs, and MQTT-based applications Explore alternative approaches to structuring IoT applications with Python Book Description The age of connected devices is here, be it fitness bands or smart homes. It's now more important than ever to understand how hardware components interact with the internet to collect and analyze user data. The Internet of Things (IoT), combined with the popular open source language Python, can be used to build powerful and intelligent IoT systems with intuitive interfaces. This book consists of three parts, with the first focusing on the "Internet" component of IoT. You'll get to grips with end-to-end IoT app development to control an LED over the internet, before learning how to build RESTful APIs, WebSocket APIs, and MQTT services in Python. The second part delves into the fundamentals behind electronics and GPIO interfacing. As you progress to the last part, you'll focus on the "Things" aspect of IoT, where you will learn how to connect and control a range of electronic sensors and actuators using Python. You'll also explore a variety of topics, such as motor control, ultrasonic sensors, and temperature measurement. Finally, you'll get

up to speed with advanced IoT programming techniques in Python, integrate with IoT visualization and automation platforms, and build a comprehensive IoT project. By the end of this book, you'll be well-versed with IoT development and have the knowledge you need to build sophisticated IoT systems using Python. What you will learn Understand electronic interfacing with Raspberry Pi from scratch Gain knowledge of building sensor and actuator electronic circuits Structure your code in Python using Async IO, pub/sub models, and more Automate real-world IoT projects using sensor and actuator integration Integrate electronics with ThingSpeak and IFTTT to enable automation Build and use RESTful APIs, WebSockets, and MQTT with sensors and actuators Set up a Raspberry Pi and Python development environment for IoT projects Who this book is for This IoT Python book is for application developers, IoT professionals, or anyone interested in building IoT applications using the Python programming language. It will also be particularly helpful for mid to senior-level software engineers who are experienced in desktop, web, and mobile development, but have little to no experience of electronics, physical computing, and IoT.

2015-08-18 Enrique Fernández Your one-stop guide to the Robot Operating System About This Book Model your robot on a virtual world and learn how to simulate it Create, visualize, and process Point Cloud information Easy-to-follow, practical tutorials to program your own robots Who This Book Is For If you are a robotic enthusiast who wants to learn how to build and program your own robots in an easy-to-develop, maintainable, and shareable way, this book is for you. In order to make the most of the book, you should have a C++ programming background, knowledge of GNU/Linux systems, and general skill in computer science. No previous background on ROS is required, as this book takes you from the ground up. It is also advisable to have some knowledge of version control systems, such as svn or git, which are often used by the community to share code. What You Will Learn Install a complete ROS Hydro system Create ROS packages and metapackages, using and debugging them in real time Build, handle, and debug ROS nodes Design your 3D robot model and simulate it in a virtual environment within Gazebo Give your robots the power of sight using cameras and calibrate and perform computer vision tasks with them Generate and adapt the navigation stack to work with your robot Integrate different sensors like Range Laser, Arduino, and Kinect with your robot Visualize and process Point Cloud information from different sensors Control and plan motion of robotic arms with multiple joints using MoveIt! In Detail If you have ever tried building a robot, then you know how cumbersome programming everything from scratch can be. This is where ROS comes into the picture. It is a collection of tools, libraries, and conventions that simplifies the robot building process. What's more, ROS encourages collaborative robotics software development, allowing you to connect with experts in various fields to collaborate and build upon each other's work. Packed full of examples, this book will help you understand the ROS framework to help you build your own

robot applications in a simulated environment and share your knowledge with the large community supporting ROS. Starting at an introductory level, this book is a comprehensive guide to the fascinating world of robotics, covering sensor integration, modeling, simulation, computer vision, navigation algorithms, and more. You will then go on to explore concepts like topics, messages, and nodes. Next, you will learn how to make your robot see with HD cameras, or navigate obstacles with range sensors. Furthermore, thanks to the contributions of the vast ROS community, your robot will be able to navigate autonomously, and even recognize and interact with you in a matter of minutes. What's new in this updated edition? First and foremost, we are going to work with ROS Hydro this time around. You will learn how to create, visualize, and process Point Cloud information from different sensors. This edition will also show you how to control and plan motion of robotic arms with multiple joints using MoveIt! By the end of this book, you will have all the background you need to build your own robot and get started with ROS. Style and approach This book is an easy-to-follow guide that will help you find your way through the ROS framework. This book is packed with hands-on examples that will help you program your robot and give you complete solutions using ROS open source libraries and tools.

2023-03-17 Danny Staple Design, build, and program a mobile robot platform while gaining an understanding of the Raspberry Pi Pico, Free CAD, and robot sensors using Python to code, Bluetooth to connect & smartphone to control your projects Key FeaturesGain in depth knowledge of robotics with easy-to-follow instructionsBuild a rover platform designed for experimentation and extensionEnhance your robot building skills through planning, building, and codingPurchase of the print or Kindle book includes a free PDF eBookBook Description The field of robotics is expanding, and this is the perfect time to learn how to create robots at home for different purposes. This book will help you take your first steps in planning, building, and programming a robot with Raspberry Pi Pico, an impressive controller bursting with I/O capabilities. After a quick tour of Pico, you'll begin designing a robot chassis in 3D CAD. With easy-to-follow instructions, shopping lists, and plans, you'll start building the robot. Further, you'll add simple sensors and outputs to extend the robot, reinforce your design skills, and build your knowledge in programming with CircuitPython. You'll also learn about interactions with electronics, standard robotics algorithms, and the discipline and process for building robots. Moving forward, you'll learn how to add more complicated sensors and robotic behaviors, with increasing complexity levels, giving you hands-on experience. You'll learn about Raspberry Pi Pico's excellent features, such as PIO, adding capabilities such as avoiding walls, detecting movement, and compass headings. You'll combine these with Bluetooth BLE for seeing sensor data and remotely controlling your robot with a smartphone. Finally, you'll program the robot to find its location in an arena. By the end of this book, you'll have built a robot at home, and be well equipped to build more with different

levels of complexity. What you will learnInterface Raspberry Pi Pico with motors to move partsDesign in 3D CAD with Free CADBuild a simple robot and extend it for more complex projectsInterface Raspberry Pi Pico with sensors and Bluetooth BLEVisualize robot data with MatplotlibGain an understanding of robotics algorithms on Pico for smart behaviorWho this book is for This book is for beginner robot makers, keen hobbyists, technical enthusiasts, developers and STEM teachers who want to build robots at home. Prior knowledge of coding - beginner to intermediate programming, will be helpful.

2017-03-31 Lentin Joseph Build a variety of awesome robots that can see, sense, move, and do a lot more using the powerful Robot Operating System About This Book Create and program cool robotic projects using powerful ROS libraries Work through concrete examples that will help you build your own robotic systems of varying complexity levels This book provides relevant and fun-filled examples so you can make your own robots that can run and work Who This Book Is For This book is for robotic enthusiasts and researchers who would like to build robot applications using ROS. If you are looking to explore advanced ROS features in your projects, then this book is for you. Basic knowledge of ROS, GNU/Linux, and programming concepts is assumed. What You Will Learn Create your own self-driving car using ROS Build an intelligent robotic application using deep learning and ROS Master 3D object recognition Control a robot using virtual reality and ROS Build your own AI chatter-bot using ROS Get to know all about the autonomous navigation of robots using ROS Understand face detection and tracking using ROS Get to grips with teleoperating robots using hand gestures Build ROS-based applications using Matlab and Android Build interactive applications using TurtleBot In Detail Robot Operating System is one of the most widely used software frameworks for robotic research and for companies to model, simulate, and prototype robots. Applying your knowledge of ROS to actual robotics is much more difficult than people realize, but this title will give you what you need to create your own robotics in no time! This book is packed with over 14 ROS robotics projects that can be prototyped without requiring a lot of hardware. The book starts with an introduction of ROS and its installation procedure. After discussing the basics, you'll be taken through great projects, such as building a self-driving car, an autonomous mobile robot, and image recognition using deep learning and ROS. You can find ROS robotics applications for beginner, intermediate, and expert levels inside! This book will be the perfect companion for a robotics enthusiast who really wants to do something big in the field. Style and approach This book is packed with fun-filled, end-to-end projects on mobile, armed, and flying robots, and describes the ROS implementation and execution of these models.

2021-11-25 Ashwin Shah Have fun with LEGO BOOST and Scratch programming while building smart robots that can interact with the world around you Key FeaturesGet up to speed with building your first LEGO BOOST robotic

modelBuild interesting robotics prototypes that can perform tasks just like real-life machinesDiscover exciting projects to bring classic LEGO bricks to life using motors and sensorsBook Description LEGO BOOST is a feature-rich creative toolbox that helps kids to develop science, technology, engineering, and mathematics (STEM) skills in a fun way. The LEGO BOOST kit consists of motors, sensors, and more than 840 LEGO pieces to bring various multifunctional robots to life. This book will take you on an interesting and enjoyable journey where you will have fun building robots while developing your problem-solving and logical thinking skills. This book is an end-to-end guide that will take you from a beginner to expert level of robot building with LEGO BOOST and Scratch. Starting with the unboxing and a brief introduction to LEGO BOOST, you'll quickly get your first robotic model up and running. You'll understand how to use the electronic and non-electronic components and have fun building a range of intriguing robotics projects with increasing complexity and advanced functionality. Throughout the book, you'll work on a variety of amazing projects, such as building your own R2D2, a fictional character from Star Wars, that will pique your curiosity to learn robotics and help you explore the full potential of the LEGO BOOST kit. Once you've had fun working with the projects, you'll be introduced to an interesting challenge for you to solve by yourself! By the end of this book, you'll have gained the skills to build creative robotics projects with the LEGO BOOST creative toolbox, and have built on your logical thinking and problem-solving skills. What you will learnUnbox the LEGO BOOST kit and understand how to get startedBuild simple robots with gears and sensorsDiscover the right parts to assemble your robotsProgram your BOOST robot using the Scratch 3.0 programming languageUnderstand complex mechanisms for advanced robotsDevelop engaging and intelligent robots using electronic and non-electronic componentsCreate more than 10 complete robotics projects from scratchDevelop logical thinking and unleash your creativityWho this book is for This book will help 7 to 12-year-old children who want to learn robotics with LEGO BOOST develop their creativity, logical thinking, and problem-solving skills. Teachers, trainers, and parents who wish to teach robotics with LEGO BOOST and Scratch will also find this book useful.

2018-04-23 Jeff Cicolani 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.

2018-05-24 Lentin Joseph Learn how to get started with robotics programming using Robot Operation System (ROS). Targeted for absolute beginners in ROS, Linux, and Python, this short guide shows you how to build your own robotics projects. ROS is an open-source and flexible framework for writing robotics software. With a hands-on approach and sample projects, Robot Operating System for Absolute Beginners will enable you to begin your first robot project. You will learn the basic concepts of working with ROS and begin coding with ROS APIs in both C++ and Python. What You'll Learn Install ROS Review fundamental ROS concepts Work with frequently used commands in ROS Build a mobile robot from scratch using ROS Who This Book Is For Absolute beginners with little to no programming experience looking to learn robotics programming.

2015-11-16 Morgan Quigley Chapter 3. Topics; Publishing to a Topic; Checking That Everything Works as Expected; Subscribing to a Topic; Checking That Everything Works as Expected; Latched Topics; Defining Your Own Message Types; Defining a New Message; Using Your New Message; When Should You Make a New Message Type?; Mixing Publishers and Subscribers; Summary; Chapter 4. Services; Defining a Service; Implementing a Service; Checking That Everything Works as Expected; Other Ways of Returning Values from a Service; Using a Service; Checking That Everything Works as Expected; Other Ways to Call Services; Summary.

2020-02-26 Bernardo Ronquillo Japón Take your ROS skills to the next level by implementing complex robot structures in a ROS simulation Key Features Learn fundamental ROS concepts and apply them to solve navigation tasks Work with single board computers to program smart behavior in mobile robots Understand how specific characteristics of the physical environment influence your robot's performance Book Description Connecting a physical robot to a robot simulation using the Robot Operating System (ROS) infrastructure is one of the most common challenges faced by ROS engineers. With this book, you'll learn how to simulate a robot in a virtual environment and achieve desired behavior in equivalent real-world scenarios. This book starts with an introduction to

GoPiGo3 and the sensors and actuators with which it is equipped. You'll then work with GoPiGo3's digital twin by creating a 3D model from scratch and running a simulation in ROS using Gazebo. Next, the book will show you how to use GoPiGo3 to build and run an autonomous mobile robot that is aware of its surroundings. Finally, you'll find out how a robot can learn tasks that have not been programmed in the code but are acquired by observing its environment. You'll even cover topics such as deep learning and reinforcement learning. By the end of this robot programming book, you'll be well-versed with the basics of building specific-purpose applications in robotics and developing highly intelligent autonomous robots from scratch. What you will learn Get to grips with developing environment-aware robots Gain insights into how your robots will react in physical environments Break down a desired behavior into a chain of robot actions Relate data from sensors with context to produce adaptive responses Apply reinforcement learning to allow your robot to learn by trial and error Implement deep learning to enable your robot to recognize its surroundings Who this book is for If you are an engineer looking to build AI-powered robots using the ROS framework, this book is for you. Robotics enthusiasts and hobbyists who want to develop their own ROS robotics projects will also find this book useful. Knowledge of Python and/or C++ programming and familiarity with single board computers such as Raspberry Pi is necessary to get the most out of this book.

2018-05-30 Prof. Diwakar Vaish Leverage the power of Python to build DIY robotic projects Key Features Design, build, and stimulate collaborative robots Build high-end robotics projects such as a customized personal Jarvis Leverage the power of Python and ROS for DIY robotic projects Book Description Robotics is a fast-growing industry. Multiple surveys state that investment in the field has increased tenfold in the last 6 years, and is set to become a \$100-billion sector by 2020. Robots are prevalent throughout all industries, and they are all set to be a part of our domestic lives. This book starts with the installation and basic steps in configuring a robotic controller. You'll then move on to setting up your environment to use Python with the robotic controller. You'll dive deep into building simple robotic projects, such as a pet-feeding robot, and more complicated projects, such as machine learning enabled home automation system (Jarvis), vision processing based robots and a self-driven robotic vehicle using Python. By the end of this book, you'll know how to build smart robots using Python. What you will learn Get to know the basics of robotics and its functions Walk through interface components with microcontrollers Integrate robotics with the IoT environment Build projects using machine learning Implement path planning and vision processing Interface your robots with Bluetooth Who this book is for If building robots is your dream, then this book is made for you. Prior knowledge of Python would be an added advantage.

2017-06-05 Donald J. Norris 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.

2013-06-09 Wolfram Donat "Since the Raspberry Pi was released in 2012, it has changed the game for both professionals and hobbyists alike. Its small size [about the size of a credit card] and low price have made it a popular alternative to the Arduino microprocessor for projects ranging from home automation to web servers to mobile image processing. Its ARM processor allows it to run a version of Debian Linux, and it can be configured to work with the physical world via onboard GPIO pins and optional extra equipment. This book is not a collection of projects for the Pi. Rather, it takes one project - a small mobile robot - and takes you step-by-step through the process of building one, from installing the libraries needed to access the GPIO pins to configuring a wireless adapter to some suggestions (not explicit instructions) on how to construct the bot's body. When you have finished, you will have a working robot that you can log into and control remotely via command line, with the possibility of using a shell or a Python script. Complete with full-color photographs and a collection of resources about where to obtain the necessary ingredients, the author also offers free support for those with questions or problems. For anyone who has wanted to do something a little more impressive with their Pi, this book is a must-have!"--P. 4 of cover.

2015-05-27 Lentin Joseph If you are an engineer, a researcher, or a hobbyist, and you are interested in robotics and want to build your own robot, this book is for you. Readers are assumed to be new to robotics but should have experience with Python.

2019-01-22 Matt Timmons-Brown 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.

2018-11-29 Danny Staple Gain experience of building a next-generation collaboration robot Key FeaturesGet up and running with the fundamentals of robotic programmingProgram a robot using Python and the Raspberry Pi 3Learn to build a smart robot with interactive and AI-enabled behaviorsBook 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 learnConfigure a Raspberry Pi for use in a robotInterface motors and sensors with a Raspberry PiImplement code to make interesting and intelligent robot behaviorsUnderstand the first steps in AI behavior such as speech recognition visual processingControl AI robots using Wi-FiPlan the budget for requirements of robots while choosing partsWho 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.

2019-01-22 Matt Timmons-Brown 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.

2015-12-21 Lentin Joseph Design, build and simulate complex robots using Robot Operating System and master its out-of-the-box functionalities About This Book Develop complex robotic applications using ROS for interfacing robot manipulators and mobile robots with the help of high end robotic sensors Gain insights into autonomous navigation in mobile robot and motion planning in robot manipulators Discover the best practices and troubleshooting solutions everyone needs when working on ROS Who This Book Is For If you are a robotics enthusiast or researcher who wants to learn more about building robot applications using ROS, this book is for you. In order to learn from this book, you should have a basic knowledge of ROS, GNU/Linux, and C++ programming concepts. The book will also be good for programmers who want to explore the advanced features of ROS. What You Will Learn Create a robot model of a Seven-DOF robotic arm and a differential wheeled mobile robot Work with motion planning of a Seven-DOF arm using MoveIt! Implement autonomous navigation in differential drive robots using SLAM and AMCL packages in ROS Dig deep into the ROS Pluginlib, ROS nodelets, and Gazebo plugins Interface I/O boards such as Arduino, Robot sensors, and High end actuators with ROS Simulation and motion planning of ABB and Universal arm using ROS Industrial Explore the ROS framework using its latest version In Detail The area of robotics is gaining huge momentum among corporate people, researchers, hobbyists, and students. The major challenge in robotics is its controlling software. The Robot Operating System (ROS) is a modular software platform to develop generic robotic applications. This book discusses the advanced concepts in robotics and how to program using ROS. It starts with deep overview of the ROS framework, which will give you a clear idea of how ROS really works. During the course of the book, you will learn how to build models of complex robots, and simulate and interface the robot using the ROS MoveIt motion planning library and ROS navigation stacks. After discussing robot manipulation and navigation in robots, you will

get to grips with the interfacing I/O boards, sensors, and actuators of ROS. One of the essential ingredients of robots are vision sensors, and an entire chapter is dedicated to the vision sensor, its interfacing in ROS, and its programming. You will discuss the hardware interfacing and simulation of complex robot to ROS and ROS Industrial (Package used for interfacing industrial robots). Finally, you will get to know the best practices to follow when programming using ROS. Style and approach This is a simplified guide to help you learn and master advanced topics in ROS using hands-on examples.

2017-09-15 Wyatt Newman A Systematic Approach to Learning Robot Programming with ROS provides a comprehensive, introduction to the essential components of ROS through detailed explanations of simple code examples along with the corresponding theory of operation. The book explores the organization of ROS, how to understand ROS packages, how to use ROS tools, how to incorporate existing ROS packages into new applications, and how to develop new packages for robotics and automation. It also facilitates continuing education by preparing the reader to better understand the existing on-line documentation. The book is organized into six parts. It begins with an introduction to ROS foundations, including writing ROS nodes and ROS tools. Messages, Classes, and Servers are also covered. The second part of the book features simulation and visualization with ROS, including coordinate transforms. The next part of the book discusses perceptual processing in ROS. It includes coverage of using cameras in ROS, depth imaging and point clouds, and point cloud processing. Mobile robot control and navigation in ROS is featured in the fourth part of the book The fifth section of the book contains coverage of robot arms in ROS. This section explores robot arm kinematics, arm motion planning, arm control with the Baxter Simulator, and an object-grabber package. The last part of the book focuses on system integration and higher-level control, including perception-based and mobile manipulation. This accessible text includes examples throughout and C++ code examples are also provided at https://github.com/wsnewman/learning_ros

2019-03-30 Dinesh Tavasalkar Enhance your programming skills to build exciting robotic projects Key FeaturesBuild an intelligent robot that can detect and avoid obstacles and respond to voice commandsDetect and track objects and faces using OpenCVControl your robot with a GUI button designed using Qt5Book Description C++ is one of the most popular legacy programming languages for robotics, and a combination of C++ and robotics hardware is used in many leading industries. This book will bridge the gap between Raspberry Pi and C/C++ programming and enable you to develop applications for Raspberry Pi. To follow along with the projects covered in the book, you can implement C programs in Raspberry Pi with the wiringPi library. With this book, you'll develop a fully functional car robot and write programs to move it in different directions. You'll then create an obstacle - avoiding robot using an ultrasonic sensor. Furthermore, you'll find out

how to control the robot wirelessly using your PC/Mac. This book will also help you work with object detection and tracking using OpenCV, and guide you through exploring face detection techniques. Finally, you will create an Android app and control the robot wirelessly with an Android smartphone. By the end of this book, you will have gained experience in developing a robot using Raspberry Pi and C/C++ programming. What you will learn

Install software in Raspberry Pi compatible with C++ programming

Program the Raspberry Pi in C++ to run a motor

Control RPi-powered robot wirelessly with your laptop or PC

Program an RPi camera using OpenCV

Control a Raspberry Pi robot with voice commands

Implement face and object detection with Raspberry Pi

Who this book is for

This book is for developers, programmers, and robotics enthusiasts interested in leveraging C++ to build exciting robotics applications. Prior knowledge of C++ is necessary to understand the projects covered in this book.

2016-05-02 Cameron Hughes

Start programming robots NOW! Learn hands-on, through easy examples, visuals, and code

This is a unique introduction to programming robots to execute tasks autonomously. Drawing on years of experience in artificial intelligence and robot programming, Cameron and Tracey Hughes introduce the reader to basic concepts of programming robots to execute tasks without the use of remote controls.

Robot Programming: A Guide to Controlling Autonomous Robots takes the reader on an adventure through the eyes of Midamba, a lad who has been stranded on a desert island and must find a way to program robots to help him escape. In this guide, you are presented with practical approaches and techniques to program robot sensors, motors, and translate your ideas into tasks a robot can execute autonomously. These techniques can be used on today's leading robot microcontrollers (ARM9 and ARM7) and robot platforms (including the wildly popular low-cost Arduino platforms, LEGO® Mindstorms EV3, NXT, and Wowie RS Media Robot) for your hardware/Maker/DIY projects. Along the way the reader will learn how to:

- Program robot sensors and motors
- Program a robot arm to perform a task
- Describe the robot's tasks and environments in a way that a robot can process using robot S.T.O.R.I.E.S.
- Develop a R.S.V.P. (Robot Scenario Visual Planning) used for designing the robot's tasks in an environment
- Program a robot to deal with the "unexpected" using robot S.P.A.C.E.S.
- Program robots safely using S.A.R.A.A. (Safe Autonomous Robot Application Architecture)
- Approach Program robots using Arduino C/C++ and Java languages
- Use robot programming techniques with LEGO® Mindstorms EV3, Arduino, and other ARM7 and ARM9-based robots.

2016-01-28 Peter McKinnon

Explore the Fascinating World of Robotics! Do you love robots? Are you fascinated with modern advances in technology? Do you want to know how robots work? If so, you'll be delighted with Robotics: Everything You Need to Know About Robotics from Beginner to Expert. You'll learn the history of robotics, learn the 3 Rules, and meet the very first robots. This book also

describes the many essential hardware components of today's robots:

- Analog and Digital brains
- DC, Servo, and Stepper Motors
- Bump Sensors and Light Sensors
- and even Robotic Bodywork

Would you like to build and program your own robot? You can use Robotics: Everything You Need to Know About Robotics from Beginner to Expert to learn the software basics of RoboCORE and how to create "brains" for creations like the Obstacle Avoiding Robot. You'll also learn which materials to use to build your robot body and which sensors you need to help your new friend perceive the world around it. This book even explains how you can construct an Autonomous Wall Climbing Robot! Don't delay - Start Reading Robotics: Everything You Need to Know About Robotics from Beginner to Expert right away! You'll be so glad you gained this exciting and powerful knowledge!

2021-02-12 Danny Staple

Develop an extendable smart robot capable of performing a complex series of actions with Python and Raspberry Pi

Key Features

- Get up to speed with the fundamentals of robotic programming and build intelligent robots
- Learn how to program a voice agent to control and interact with your robot's behavior
- Enable your robot to see its environment and avoid barriers using sensors

Book 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 learn

- Leverage the features of the Raspberry Pi OS
- Discover how to configure a Raspberry Pi to build an AI-enabled robot
- Interface motors and sensors with a Raspberry Pi
- Code your robot to develop engaging and intelligent robot behavior
- Explore AI behavior such as speech recognition and visual processing
- Find out how you can control AI robots with a mobile phone over Wi-Fi
- Understand how to choose the right parts and assemble your robot

Who 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.

2015-09-02 David Cook

"I wrote this book because I love building robots. I want you to love building robots, too. It took me a while to learn about many of the tools and parts in amateur robotics. Perhaps by writing about my experiences, I can give you a head start."-- David Cook

Robot Building for Beginners, Third Edition provides basic, practical knowledge on getting started in amateur robotics. There is a mix of content: from serious reference tables and descriptions to personal stories and humorous bits. The robot described and built in this book is battery powered and about the size of a lunch box. It is autonomous; that is, it isn't remote controlled. The book is broken up into small chapters, suitable for bedtime (or bathroom) reading. The characteristics and purposes of each major component (resistor, transistor, wire, and motor) are described, followed by a hands-on experiment to demonstrate. Not only does this help the reader to understand a particular piece, but it also prepares them with processes to learn new parts on their own. An appendix offers an introduction to 3D printing and parts of the robot can, as an alternative, be "printed" using a 3D printer. The master project of the book is a simple, entertaining, line-following robot.

2014-12-04 Wolfram Donat

Make a Raspberry-Pi Controlled Robot teaches you how to build a capable and upgradeable personal robot for around \$100. You'll learn how to control servos, respond to sensor input, and know where your bot is using GPS. You'll also learn many ways to connect to your robot and send it instructions, from an SSH connection to sending text messages from your phone.

2014-10-22 Matt Richardson

What can you do with the Raspberry Pi, the affordable computer the size of a credit card? All sorts of things! If you're learning how to program--or looking to build new electronic projects, this hands-on guide will show you just how valuable this flexible little platform can be. Updated to include coverage of the Raspberry Pi Model B+, Getting Started with Raspberry Pi takes you step-by-step through many fun and educational possibilities. Take advantage of several preloaded programming languages. Use the Raspberry Pi with Arduino. Create Internet-connected projects. Play with multimedia. With Raspberry Pi, you can do all of this and more. In Getting Started with Raspberry Pi, you'll:

- Get acquainted with hardware features on the Pi's board
- Learn enough Linux to move around the operating system
- Start programming in Python and Scratch
- Draw graphics, play sounds, and handle mouse events with Pygame
- Use the Pi's input and output pins to do some hardware hacking
- Discover how Arduino and the Raspberry Pi can work together
- Create your own Pi-based web server with Python
- Work with the Raspberry Pi Camera Module and USB webcams

2021-01-29 Lloyd Brombach

Learn how to build and program real autonomous robots

KEY FEATURES

- Ê Simplified coverage on fundamentals of building a robot platform.
- Ê Learn to program Raspberry Pi for interacting with hardware.
- Ê Cutting-edge coverage on autonomous motion, mapping, and path planning algorithms for advanced robotics.

DESCRIPTION Practical Robotics in C++ teaches the complete spectrum of Robotics, right from the setting up a computer for a robot controller to putting power to the wheel motors. The book brings you the workshop knowledge of the electronics, hardware, and software for building a mobile robot platform. You will learn how to use sensors to detect obstacles, how to train your robot to build itself a map and plan an obstacle-avoiding path, and how to structure your code for modularity and interchangeability with other robot projects. Throughout the book, you can experience the demonstrations of complete coding of robotics with the use of simple and clear C++ programming. In addition, you will explore how to leverage the Raspberry Pi GPIO hardware interface pins and existing libraries to make an incredibly capable machine on the most affordable computer platform ever. WHAT YOU WILL LEARN Write code for the motor drive controller. Build a Map from Lidar Data. Write and implement your own autonomous path-planning algorithm. Write

code to send path waypoints to the motor drive controller autonomously. Get to know more about robot mapping and navigation. WHO THIS BOOK IS FOR This book is most suitable for C++ programmers who have keen interest in robotics and hardware programming. All you need is just a good understanding of C++ programming to get the most out of this book. TABLE OF CONTENTS 1. Choose and Set Up a Robot Computer 2. GPIO Hardware Interface Pins Overview and Use 3. The Robot Platform 4. Types of Robot Motors and Motor Control 5. Communication with Sensors and other Devices 6. Additional Helpful Hardware 7. Adding the Computer to Control your Robot 8. Robot Control Strategy 9. Coordinating the Parts 10. Maps for Robot Navigation 11. Robot Tracking and Localization 12. Autonomous Motion 13. Autonomous Path Planning 14. Wheel Encoders for Odometry 15. Ultrasonic Range Detectors 16. IMUs: Accelerometers, Gyroscopes, and Magnetometers 17. GPS and External Beacon Systems 18. LIDAR Devices and Data 19. Real Vision with Cameras 20. Sensor Fusion 21. Building and Programming an Autonomous

Robot

2012-11-23 Simon Monk Program your own Raspberry Pi projects Create innovative programs and fun games on your tiny yet powerful Raspberry Pi. In this book, electronics guru Simon Monk explains the basics of Raspberry Pi application development, while providing hands-on examples and ready-to-use scripts. See how to set up hardware and software, write and debug applications, create user-friendly interfaces, and control external electronics. Do-it-yourself projects include a hangman game, an LED clock, and a software-controlled roving robot. Boot up and configure your Raspberry Pi Navigate files, folders, and menus Create Python programs using the IDLE editor Work with strings, lists, and functions Use and write your own libraries, modules, and classes Add Web features to your programs Develop interactive games with Pygame Interface with devices through the GPIO port Build a Raspberry Pi Robot and LED Clock Build professional-quality GUIs using Tkinter