

Build Your Own Raspberry Pi Controlled Robot: The Ultimate Guide for Beginners

In this guide you will learn how to build a basic robot controlled by a Raspberry Pi. The robot will be able to move forward, backward, left, and right, and it will be able to sense its surroundings using ultrasonic sensors.

This guide is designed for beginners, so no prior knowledge of robotics or programming is required. However, you will need some basic electronics skills, such as how to solder and how to use a multimeter.



Make a Raspberry Pi-Controlled Robot: Building a Rover with Python, Linux, Motors, and Sensors

by Wolfram Donat

★★★★☆ 4.1 out of 5

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Materials

To build this robot, you will need the following materials:

* Raspberry Pi 3 Model B+ * Adafruit Motor Shield V2 * 2x DC motors with gearboxes * 2x wheels * Ultrasonic sensor * Battery pack * Jumper wires * Breadboard * Soldering iron * Multimeter

Assembly

The first step is to assemble the robot chassis. The chassis is made from a piece of acrylic or plywood. You can cut the chassis to any size you want, but it should be large enough to hold the Raspberry Pi, the motor shield, and the batteries.

Once you have cut the chassis, you need to mount the Raspberry Pi and the motor shield to the chassis. You can use screws or bolts to mount the components.

Next, you need to connect the motors to the motor shield. The motor shield has four terminals for connecting motors. The terminals are labeled "M1", "M2", "M3", and "M4". The positive terminal of the motor should be connected to the "M+" terminal on the motor shield, and the negative terminal of the motor should be connected to the "M-" terminal on the motor shield.

Once the motors are connected to the motor shield, you need to connect the motor shield to the Raspberry Pi. The motor shield has a 40-pin header that plugs into the Raspberry Pi's GPIO header.

Finally, you need to connect the ultrasonic sensor to the Raspberry Pi. The ultrasonic sensor has three wires: a power wire, a ground wire, and a signal wire. The power wire should be connected to the 5V rail on the Raspberry Pi, the ground wire should be connected to the ground rail on the Raspberry Pi, and the signal wire should be connected to GPIO pin 18 on the Raspberry Pi.

Programming

The next step is to program the robot. The robot's program will control the motors and the ultrasonic sensor.

The following Python program will control the robot:

```
python import RPi.GPIO as GPIO import time

# Set up the GPIO pins GPIO.setmode(GPIO.BCM) GPIO.setup(18,
GPIO.IN)

# Set up the motor shield motor_shield = Adafruit_MotorShield()
motor_shield.begin()

# Set up the motors motor1 = motor_shield.motor1 motor2 =
motor_shield.motor2

# Set the motor speed motor1.setSpeed(100) motor2.setSpeed(100)

# Main loop while True: # Read the ultrasonic sensor distance =
GPIO.input(18)

# If the distance is less than 10 cm, stop the motors if distance
```

In this guide, you learned how to build a basic robot controlled by a Raspberry Pi. This robot is just a starting point, and you can add many features to it, such as a camera, a speaker, or a robotic arm.

With a little creativity, you can use your Raspberry Pi to build any type of robot you can imagine.

Additional Resources

* [Raspberry Pi](https://www.raspberrypi.org/) * [Adafruit Motor Shield V2] (https://www.adafruit.com/product/1438) * [Ultrasonic Sensor] (https://www.adafruit.com/product/746) * [Python GPIO Library] (https://pypi.org/project/RPi.GPIO/) * [Adafruit Motor Shield Python Library] (https://github.com/adafruit/Adafruit-Motor-Shield-Python)

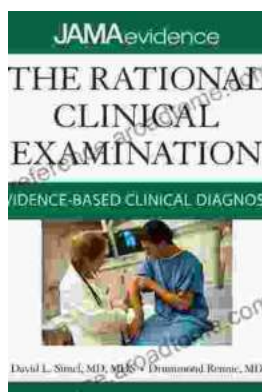


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