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The 10 Best Raspberry Pi IoT Projects

Want to make an Internet of Things project with your Raspberry Pi? Check out these inspiring IoT ideas.

BY CHERIE TAN

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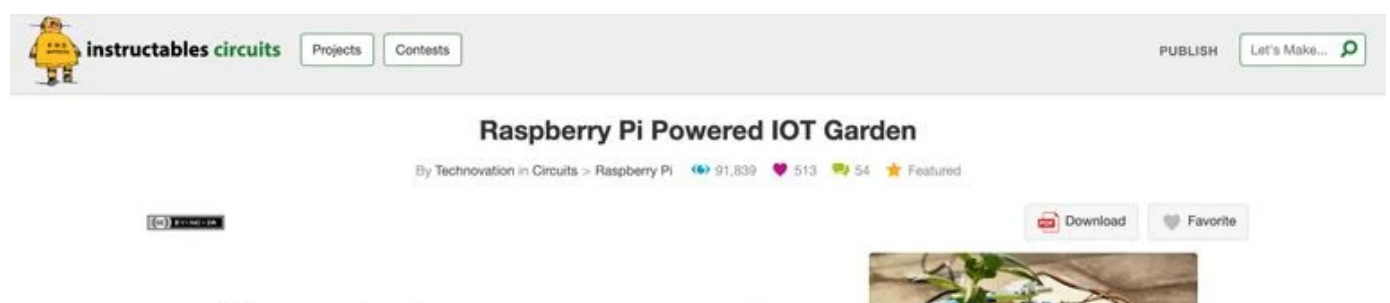
Image Credit: Hacker Shack/YouTube



Launched in 2012, the Raspberry Pi single-board computer has had a lot of different versions since then, from ever more powerful standard credit-card-sized boards to the even smaller Pi Zero and the keyboard-embedded Pi 400.

Around the world, it's been used for home automation, edge computing, and many Internet of Things (IoT) projects. In this article, we'll take a closer look at ten impressive IoT projects made with the Raspberry Pi.

1. Raspberry Pi Powered IoT Garden



Smartphone controlled



A smart garden checks on the plants' environment to ensure the optimal conditions for them to grow. This project automatically waters plants when the soil is dry. It even turns on the lights when it gets too dark.

A Raspberry Pi is used with a Grove Pi+ board to collect data from the sensors as well as operating various actuators. The air humidity, temperature, and brightness levels in the area are recorded, as is soil moisture. Users can monitor these values when they check on their plants via a custom smartphone app.

2. DIY Raspberry Pi Mini Garden

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After reading Steve Lohr's book '[Data-Is-m](#)', it became clear how big data – the recent evolution in computing, cheap computing power, cheap storage, cheap

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As its name suggests, this is a mini garden that you can water from anywhere in the world!

The hardware for this project includes a Raspberry Pi 3B, jumper wires, relay, water pump,

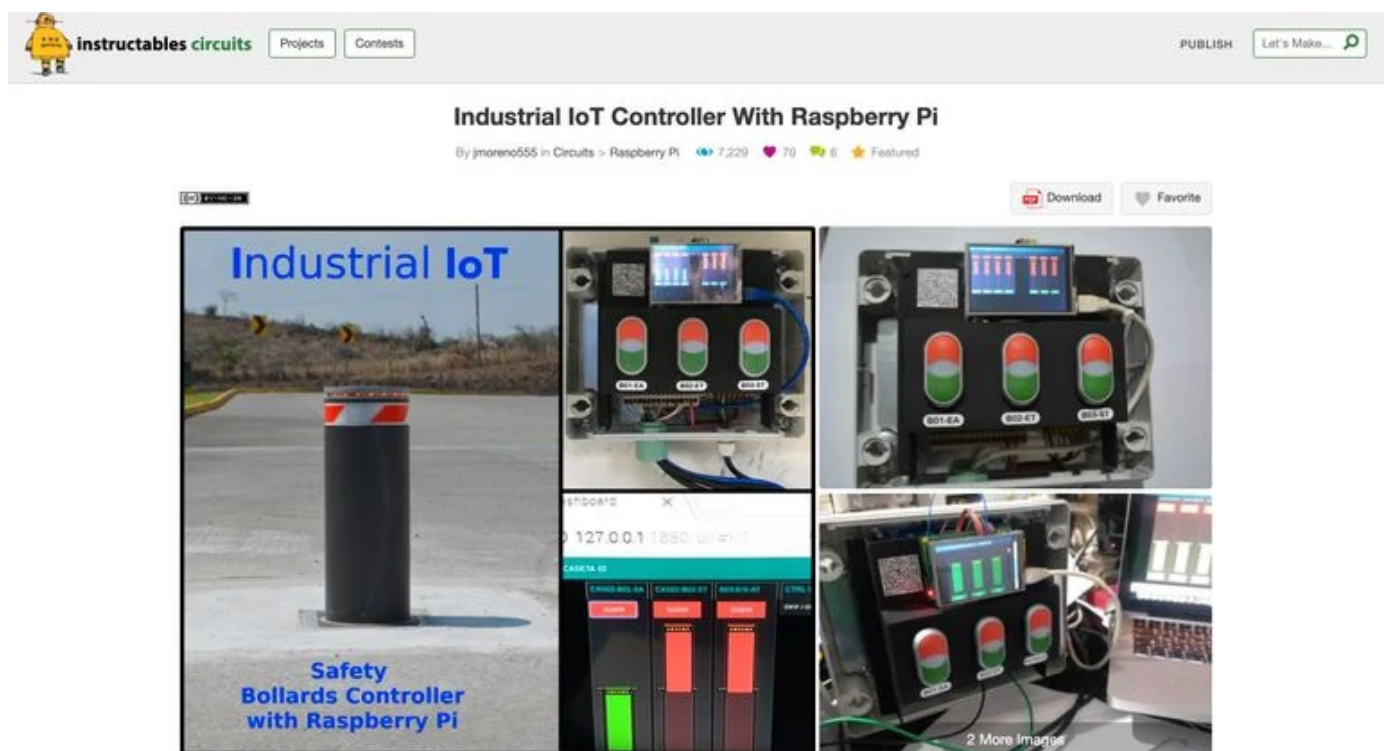
power adapter, and a current distributor.

Every 10 seconds, the Raspberry Pi sends a signal to the web server and checks if it should water the plant.

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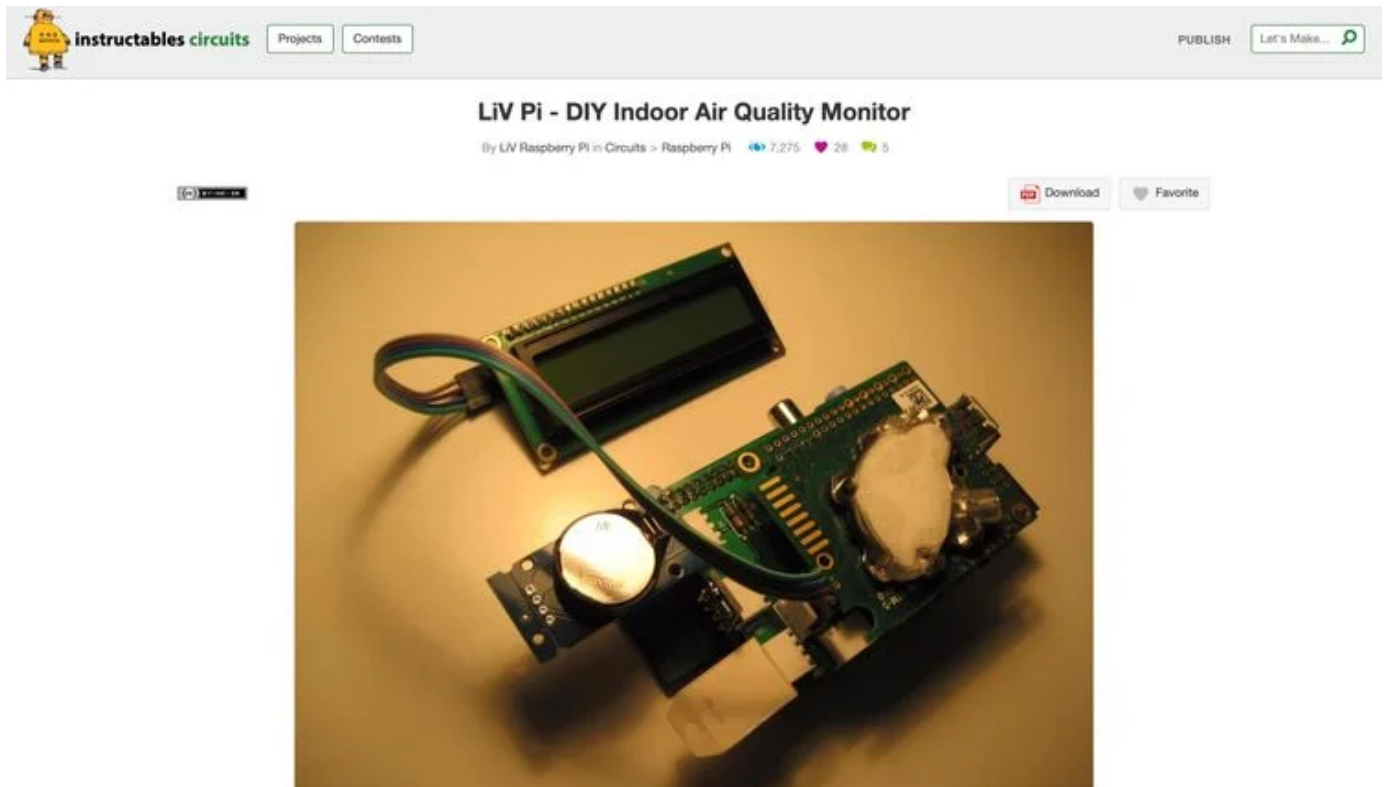
3. An Industrial IoT Controller



The Raspberry Pi has proven an excellent alternative to programmable logic controllers, a standard in many industries including automation and manufacturing. It is relatively inexpensive and efficient at carrying out programmed tasks through its GPIO interface. Its makers have even designed a board dedicated for its implementations in industrial settings: the Raspberry Pi Compute Module.

This project is a system that controls bollards. The core components required includes the Raspberry Pi 3B+, a 3.5-inch LCD touchscreen, an 8-channel 5V relay module, a 5V power supply, and terminal blocks for making electrical connections. Everything is placed in an ABS plastic enclosure with IP65 protection.

4. Air Quality Monitor



Build your own home automation system, starting with this indoor air quality monitoring HAT for the Raspberry Pi. The LiV Pi is an expansion board that turns your Raspberry Pi into an indoor air quality monitoring device. Measure the carbon dioxide level, temperature, humidity and, air pressure of your bedroom, greenhouse, garage, or other setting.

The other components for the project include a DHT22 temperature and humidity sensor, a BMP180 air pressure sensor, an LCD display, connection cable, a DS3231 RTC module, a 16GB microSD card, and of course a Raspberry Pi.

5. Smart Energy Monitor





Want a project that monitors both energy use as well as production? If your home has a solar panel or another way to make its own power, this project will help you keep track of how much energy your home uses and how much power it produces too!

The software and hardware are completely open-source and the team has put together in-depth documentation on how you can utilize a Raspberry Pi to create this system. Data is extracted every 0.5 seconds with an MCP3008 ADC coupled to up to six current sensors to offer real-time usage data, displayed using Grafana so you can view all of the information at once.

6. Water Level Monitor

The screenshot shows the Hackster.io project page for 'Water Level Monitor with Raspberry pi' by shafin kothia, published April 22, 2020. The project description states: 'Always forget to turn the tap off for a bucket and it overflows? This project will help you'. The project is marked as 'Beginner' and has 'Full instructions provided', a duration of '1 hour', and '15,428' views. The main image shows a Raspberry Pi 3 Model B connected to an ultrasonic distance sensor, a buzzer, and jumper wires, all connected to a blue bucket of water. The page also features a sidebar with navigation links (Overview, Things, Story, Connections, Structure, Code, Schematics, Credits, Comments (3)), a top navigation bar with links (Projects, News, Contests, Events, Videos, Workshops), and a right sidebar with related channels and tags (artificial intelligence, home automation, internet of things, robotics, water) and related projects (Water Level Monitor Using Raspberry Pi and OLED display, Interface speaker with).

Water level monitoring is used in water treatment applications, such as for pump control and channel flow measurements. Although this simple system works with a bucket of water, it demonstrates this principle, and was made with a Raspberry Pi 3 Model B, an ultrasonic distance sensor, buzzer, and some jumper wires.

When the distance of the ultrasonic sensor from the water is within the range of 4

When the distance of the ultrasonic sensor from the water is within the range of 4 centimeters, the buzzer makes a sound, alerting you that the bucket is almost full. You could build a similar project using a special [liquid level sensor](#) instead.

7. Smart Video Doorbell



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At the heart of this DIY smart doorbell is a Raspberry Pi 3B connected to an LCD display, a camera, STEMMA speaker, and a plug-and-play amplifier.

According to the maker, the software side of things is relatively simple, with only a couple hundred lines of code. As for the video calls, the free encrypted video conferencing app Jitsi Meet was used.

8. Pi Roomba

I have put a [Raspberry Pi](#) on my [Roomba](#) robot vacuum cleaner. The next section deals with the why; then we cover the how, link to the code, etc.

Controlling

The Roomba is an autonomous robot vacuum cleaner that can be bought on line or, on occasion, from department stores. The machine has an interesting history in that it is manufactured by [iRobot](#), the company set up by [Rodney Brooks](#) and others from MIT in the 1990's. The company has sold around six million Roombas[1] and the machine has in effect defined its own market with several imitations now available. Today however iRobot is probably more famous for producing the [Packbot](#) series of military remote control robots -- time for a quick visit to the campaign to [stop killer robots](#)?

The illustrious pedigree of the Roomba is evident in the way it works. The Roomba does not map the room but rather performs a semi random walk that is likely to cover any given spot multiple times (see time lapse photo). With no sense of location, the roomba is often seen as little more than a toy by

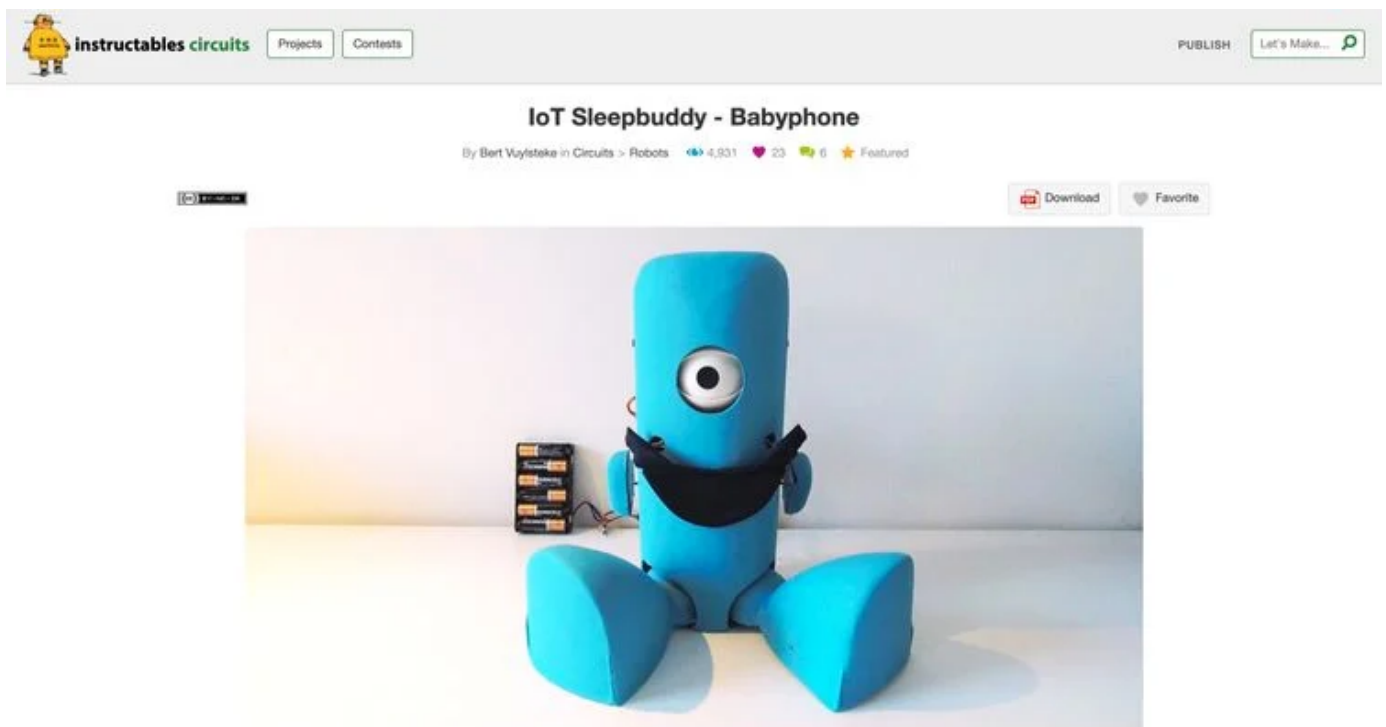


The Roomba is an autonomous robot vacuum cleaner which takes a random path around the floor. Using a Raspberry Pi, this project makes it smarter.

In this project, a Roomba 530 was used in conjunction with a Raspberry Pi. To connect the two, a serial connection is required, along with a way to power the Raspberry Pi from the 18 volt power supply of the Roomba.

The Roomba was modified to fit a plastic case on top to house the Pi. The case is connected to the Roomba's bumper; this way, when the Roomba moves under a chair and it catches the case, the force is then transmitted to the bump sensors. The software will then figure out what to do.

9. Sleepbuddy IoT Babysitter



This IoT babysitter is connected to a smartphone, tablet, or computer. You can control all of his emotions, microphone, gestures, speaker, and camera with a button.

There is a hidden camera in the eye to monitor the surroundings and children. The speaker and microphone make it possible to talk to the kids through Wi-Fi. The Sleepbuddy also comes with blackboard paint, so if they fancy doing so, kids can decorate their robot friends with chalk just before bedtime.

10. Raspberry Pi AI Teasmade

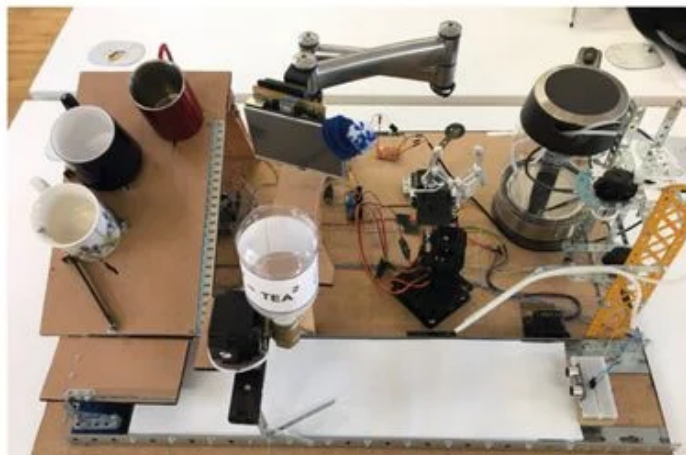


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If you're a fan of the Raspberry Pi and enjoy a good cup of tea, then this is the project for you. The 'R2-Tea2' was designed and built with the focus of creating a robot tea-maker that was a hybrid of a chatbot and a tea maker. Based on the user's responses in conversation, it decides what kind of tea to make.

There is also AI implemented here which analyses the user's day to approximate their current stress level. Then, depending on the stress level, it decides what kind of cup to use, which kind of tea to make, how much milk to add, and for how long it should brew the tea!

Which Raspberry Pi IoT Project?

You're likely to find something you like among these beginner-friendly IoT projects. For some of them, you can adapt them by using a different model of Raspberry Pi.

Start with a simple project and work your way up from there; you'll learn the fundamentals