Open source robots: to make, or not to make?

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Inria and ENS-PSL

OPEN SOURCE

OPEN SOURCE ROBOTS

SHARING THE TOOLS

TO MAKE, OR NOT TO MAKE?

Open source

Case 1: my code is in a public repository.

Is it open source?

Case 2: my code is on a USB stick I gave to a friend.

Is it open source?

Case 3: my code is in a public repository, with the GPLv3 license.

Is it open source?

Case 4: my code is in a public repository, with the CC-BY-NC license.

Is it open source?

My code is ... Is it open source?

1. **Public:** maybe not
2. **USB stick:** maybe
3. **Public, GPLv3:** yes
4. **Public, CC-BY-NC:** no

The goal of open source is to foster *conditions for collaboration.*

The Open Source Definition (1998):

- **Free redistribution (1):** no royalty, software can be sold, …
- **Source code (2–4):** is included, can be modified, …
- **No discrimination (5–10):** against persons, fields, joint software, …

(Says nothing about the capacity of users to run the software.)

Define "open source" for robots:

1. **Software:** open source license (copyleft or permissive)
2. **Mechanics:** which license?
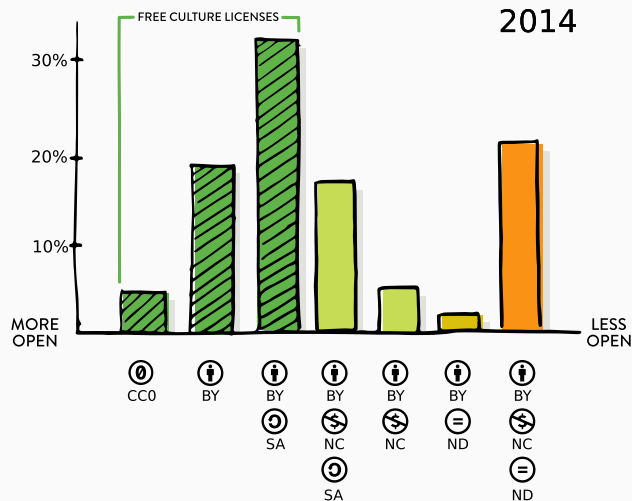3. **Electronics:**[1] which license?

Copyleft? Permissive? Creative Commons?

OSHWA?[2]

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[1]Thanks to Olivier Stasse for pointing this out (this is incomplete in what follows!)
[2]Thanks to Thomas Flayols for pointing this out.

FREE CULTURE LICENSES

2014

30%

20%

10%

MORE
OPEN

LESS
OPEN

CC0 · BY · BY SA · BY NC SA · BY NC · BY ND · BY NC ND

License: `Free-cultural-license-cc.svg`, Wikimedia Commons (CC-BY-4.0)

Open source robots

Awesome Open Source Robots ![awesome]

A curated list of awesome robots that are fully open source, both hardware and software.

Contents

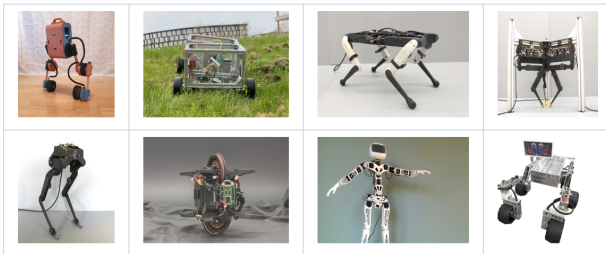- Robots
  - Bipeds
  - Educational
  - Humanoids
  - Quadrupeds
  - Wheeled
- Gallery
- Add a Robot to the List

Robots

Bipeds

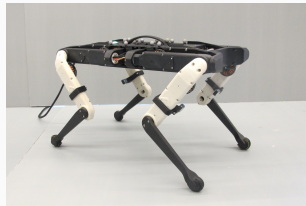| Name	Type	License	Build	Software
Bolt	Point-foot	CC0-1.0	Instructions	GitHub
Kayra	Flat-foot	BSD-3-Clause	Instructions	GitHub
Upkie	Wheeled	Apache-2.0	GitHub	GitHub

Gallery

Add a Robot to the List

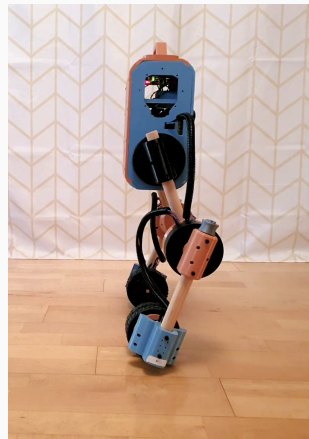New robots are welcome to the list, as long as they are open source in both hardware and software.

https://github.com/tasts-robots/awesome-open-source-robots

- Software:
  - Released: ✓
  - License: BSD-3-Clause
- Mechanics:
  - Released: ✓
  - License: BSD-3-Clause
- Electronics:
  - PCB: ✓
  - Firmware: ✓
  - License: BSD-3-Clause
- Build instructions: ✓

`https://open-dynamic-robot-initiative.github.io/`

- **Software:**
  - Released: ✓
  - License: Apache-2.0
- **Mechanics:**
  - Released: ✓
  - License: Apache-2.0
- **Electronics:** (from mjbots)
  - PCB: ✓
  - Firmware: ✓
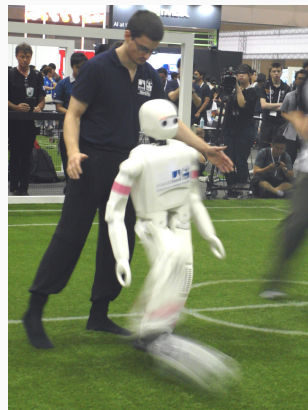 - License: Apache-2.0
- **Build instructions:** ✓

`https://github.com/tasts-robots/upkie`

- **Software:**
  - Released: ✓
  - License: BSD-3-Clause
- **Mechanics:**
  - Released: ✓
  - License: CC-BY-NC-SA-3.0*
    - * not open source
- **Electronics:** ?
- **Build instructions:** ✗

Works in progress that may become open source (nudge nudge!):

	License	Released	Instructions	At JNRH?
Borinot	not yet	not yet	not yet	Fri 15:30–15:45
Rhea	?	partially	-	-
Sassa	✓	not yet	not yet	Fri 10:30–11:30

SHARING THE TOOLS

What Technology Wants

What Technology Wants is a 2010 nonfiction book by Kevin Kelly focused on technology as an extension of life. **Wikipedia**

Author: Kevin Kelly

Subjects: Culture, Human, Life, Technology

Publisher: Viking Press

↓

Tools

- Software:
  - Released: ✓
  - License: Apache-2.0
- Mechanics:
  - Released: ✓
  - License: Apache-2.0
- Electronics:
  - PCB: ✓
  - Firmware: ✓
  - License: Apache-2.0
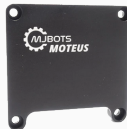- Support: empirically ≈ 24/7 on Discord

https://mjbots.com/
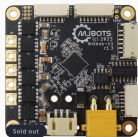
moteus r4.11 controller
$104.00 USD

moteus r4.11 developer kit
$224.00 USD

moteus r4 heat spreader
$29.00 USD

qdd100 beta 3 servo
$539.00 USD

moteus n1
Sold out
$159.00 USD

qdd100 beta 3 developer kit
$659.00 USD

moteus n1 developer kit
Sold out
$279.00 USD

moteus n1 heat spreader
$29.00 USD

https://mjbots.com/

To make, or not to make?

"Seul, on va plus vite. Ensemble, on va plus loin."