

airo-mono

Python packages for robotic manipulation

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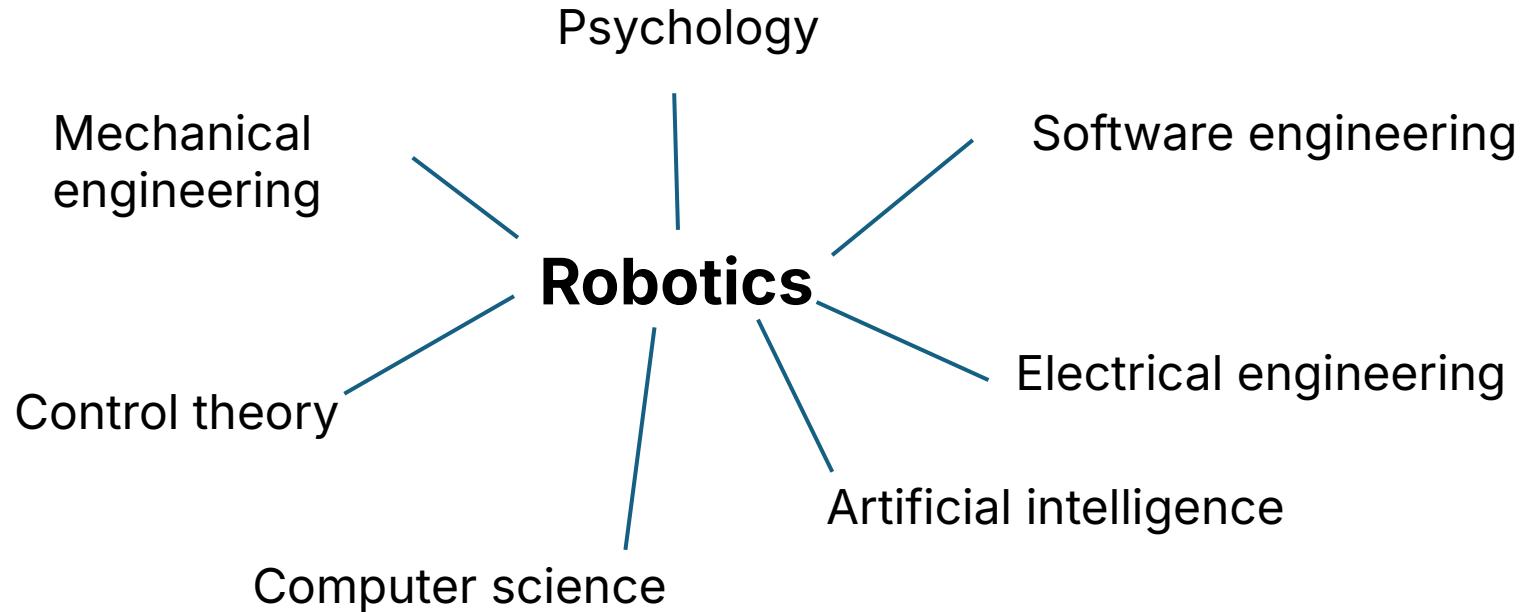


Adaptive neural networks

Automotive - Industry 4.0

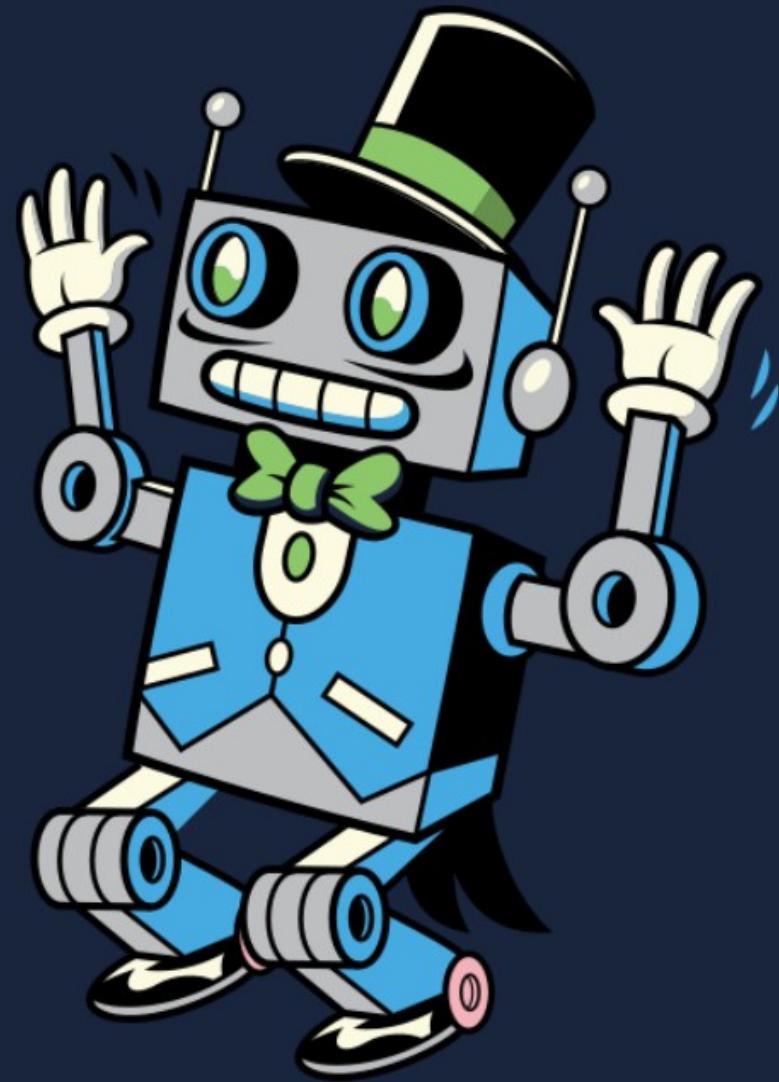


Getting started in robotics, as anyone will tell you,
is very hard – Chris Paxton (Agility Robotics)



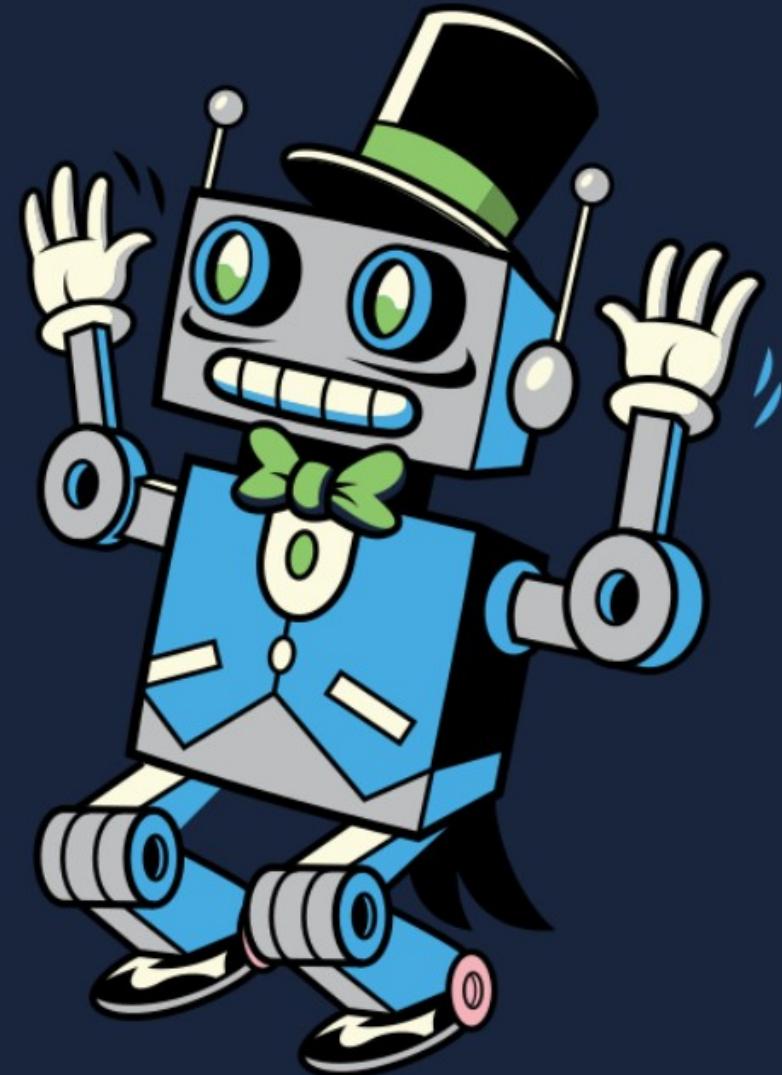
ROS comes to the rescue

**ROS - Robot Operating
System**



ROS comes to the rescue. Or does it?

ROS - Robot Operating System



What if programming robots was this simple?

```
robot_ip_address = "10.40.0.162"

camera = Zed()
robot = URrtde(ip_address=robot_ip_address)
gripper = Robotiq2F85(ip_address=robot_ip_address)

image = camera.get_rgb_image()
grasp_pose = select_grasp_pose(image) # example: user provides grasp pose
robot.move_linear_to_tcp_pose(grasp_pose).wait()
gripper.close().wait()
```

airo-mono has a low barrier to entry

Robot Operating System (ROS) 2	airo-mono
Industry standard with a large ecosystem	Limited to what we have and need in the lab
Notorious learning curve	Easy to learn
System-wide installation	Supports anaconda / virtual environments
Linked to specific Ubuntu versions	Simply pip install airo-robots

Robotics software should make our life easier,
not harder

Keep Simple Things Simple



Robotics software should make our life easier,
not harder

Keep Simple Things Simple
to facilitate **short-lived projects**



Robotics software should make our life easier,
not harder

Keep Simple Things Simple
to facilitate short-lived projects
for novice and advanced roboticists



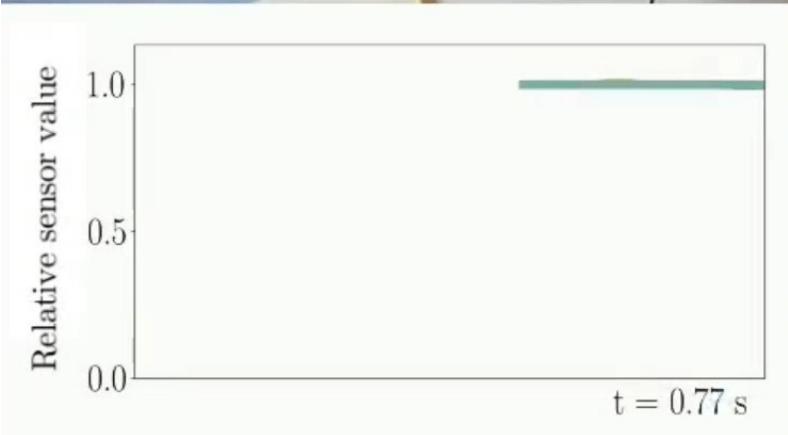
airo-mono offers multiple Python packages, each with a distinct focus

 airo-camera-toolkit	RGB(D) camera, image, and point cloud processing
 airo-dataset-tools	Creating, loading, and manipulating datasets
 airo-robots	Simple interfaces for controlling robot arms and grippers
 airo-spatial-algebra	Transforms and SE3 pose conversions
 airo-teleop	Intuitive teleoperation of robot arms
 airo-typing	Type definitions and conventions

Sister packages offer additional functionality

 airo-blender	Synthetic data generation with Blender
 airo-models	Collection of robot and object models and URDFs
 airo-drake	Integration with Drake
 airo-planner	Motion planning interfaces
 airo-tulip	Driver for the KELO mobile robot platform
 airo-ipc	Inter-process communication library

Teleoperation, 1x



airo-mono speeds up research and education

It takes **less than an hour** to go from a fresh Ubuntu installation to programming robots

We have **in-house experts**

It's a **living document of expert knowledge** in the lab

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Communicating
through GitHub
issues and PRs
preserves knowledge!

Maintaining airo-mono has a cost

Turnover in academia means a loss of knowledge

Publish or perish conflicts with writing clean and reusable code

There are **mismatched incentives** to refactor research code:
"What's in it for me?"

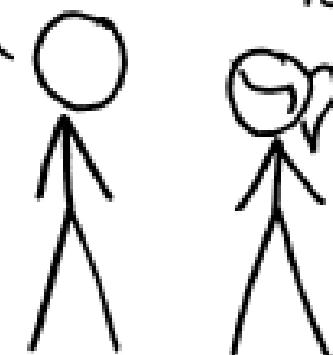
There's a limit to what we want to support

HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)

SITUATION:
THERE ARE
14 COMPETING
STANDARDS.

14?! RIDICULOUS!
WE NEED TO DEVELOP
ONE UNIVERSAL STANDARD
THAT COVERS EVERYONE'S
USE CASES.

YEAH!



SOON:

SITUATION:
THERE ARE
15 COMPETING
STANDARDS.

Programming robots *can* be this simple

```
robot_ip_address = "10.40.0.162"

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robot.move_linear_to_tcp_pose(grasp_pose).wait()
gripper.close().wait()
```



airo-mono

Public

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main

22 Branches

7 Tags

Go to file

t

Add file

Code



m-decoster Deprecate AsyncExecutor ✓

6942b73 · 2 hours ago 351 Commits



.github

Update pre-commit/action to v3.0.1 (#157)

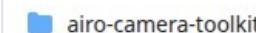
8 months ago



.vscode

refactor and test (re)projection code

3 years ago



airo-camera-toolkit

Release 2025.11.0

last week



airo-dataset-tools

Release 2025.11.0

last week



airo-robots

Deprecate AsyncExecutor

2 hours ago



airo-spatial-algebra

Release 2025.11.0

last week



airo-teleop

Release 2025.11.0

last week



airo-typing

Release 2025.11.0

last week



docs

Update the getting started guide

4 months ago



scripts

Add tools for publishing to PyPI and publish version 202...

8 months ago



.bumpversion.toml

Add versioning (#107)

last year



.flake8

setup pre-commit and pytest

3 years ago



.gitignore

new pkg structure and separate pkg for typing

3 years ago



.pre-commit-config.yaml

Initial camera intrinsics format. (#37)

2 years ago

About



Python packages for robotic manipulation @ IDLab AI & Robotics Lab - UGent - imec

airo.ugent.be

robotics

Readme

MIT license

Cite this repository

Activity

Custom properties

26 stars

6 watching

2 forks

Audit log

Report repository

Releases 5

[v2025.11.0](#) Latest

last week

+ 4 releases

