

Autonomous exploration, active learning and human guidance with open-source Poppy humanoid robot platform and Explauto library




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Demonstration

Please Interact !

Torso is learning how to move its arm to control the ball, light and sounds, help him!

- Use **Tablet** to tell Torso to explore the effect space you want (Hand, Ball, Light,...)
- or **Push Demo Button** , then
 - move left arm to show Torso how to control the joystick
 - or move left joystick to show Torso how to control Ergo and push the ball !

Why ?

Demo of our **open** platform with Poppy robots and Explauto library:

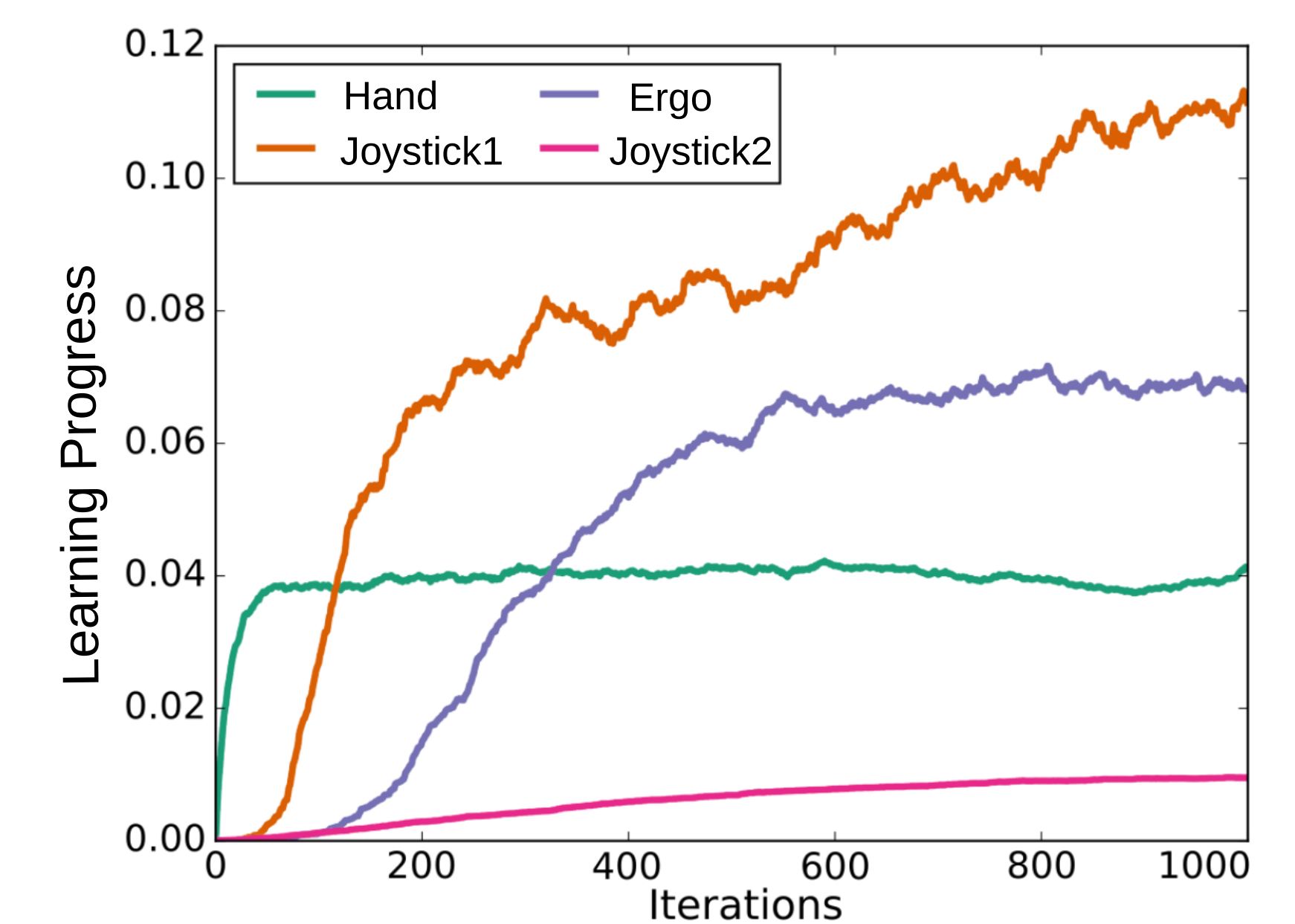
- To allow **non-roboticists researchers** to conduct robotic learning experiments
- To **benchmark algorithms** for active policy learning in multi-tasks robots.

github.com/sebastien-forestier/NIPS2016

Intrinsically motivated multi-task reinforcement learning

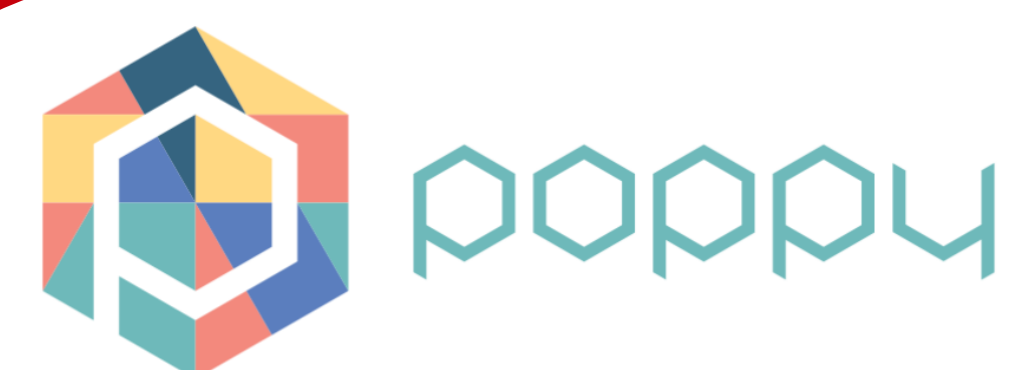
Intrinsically motivated RL allows:

- To learn **parameterized policies**
- To solve families of **parameterized problems**
- Problems structured in spaces that can be organized in a **hierarchy of reusable skills**.



Forestier, S. and Oudeyer, P.-Y. (2016). Modular active curiosity-driven discovery of tool use. In 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Daejeon, Korea.

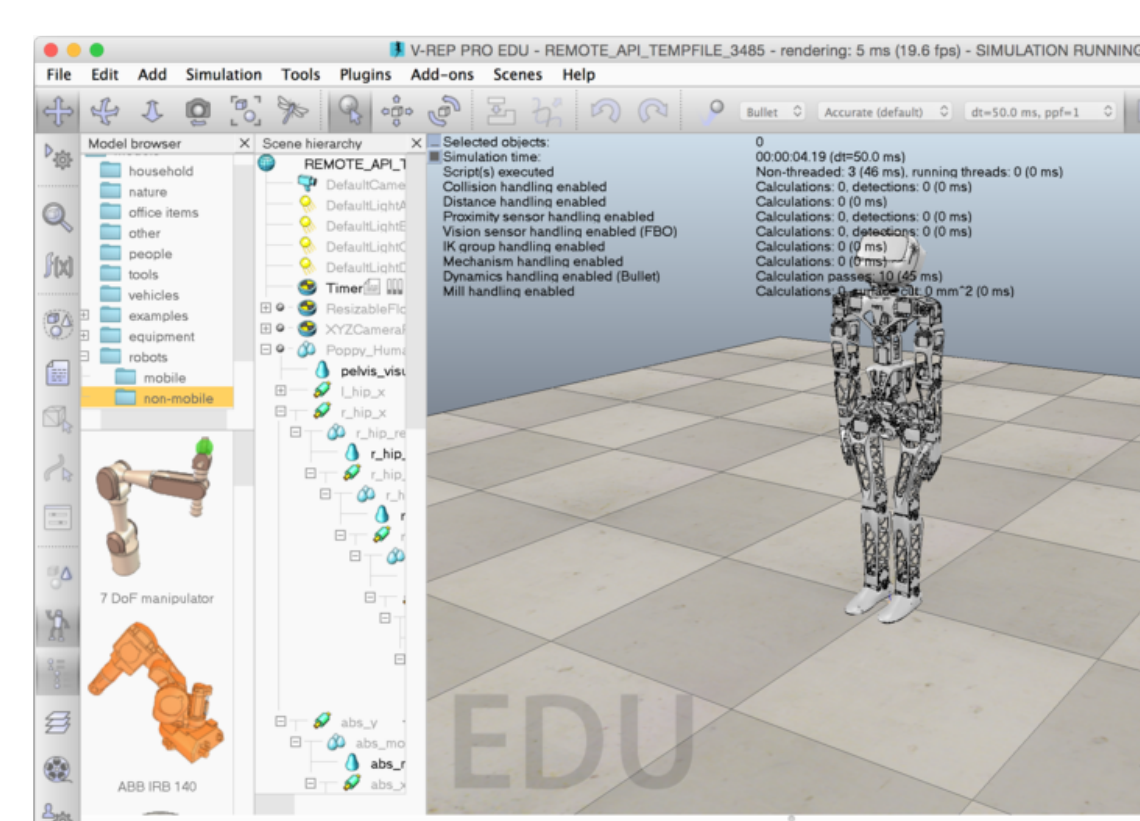
github.com/sebastien-forestier/ExplorationAlgorithms



Poppy: an experimental platform for science

Make scientific output openly accessible, reproducible and cumulative!

- Poppy is **accessible** in terms of **cost** and **complexity**, allowing researchers to share hardware and experimental details.
- **Fast design, building** and **experimentation** of **alternative morphologies**: 3D printing and rapid prototyping techniques now make it possible!



V-REP simulator



Humanoid



Ergo Jr

Make your Ergo Jr jump in 3 lines of code

```
In [ ]: from poppy.creatures import PoppyErgoJr
        jr = PoppyErgoJr()
In [ ]: jr.jump.start()
```

www.poppy-project.org



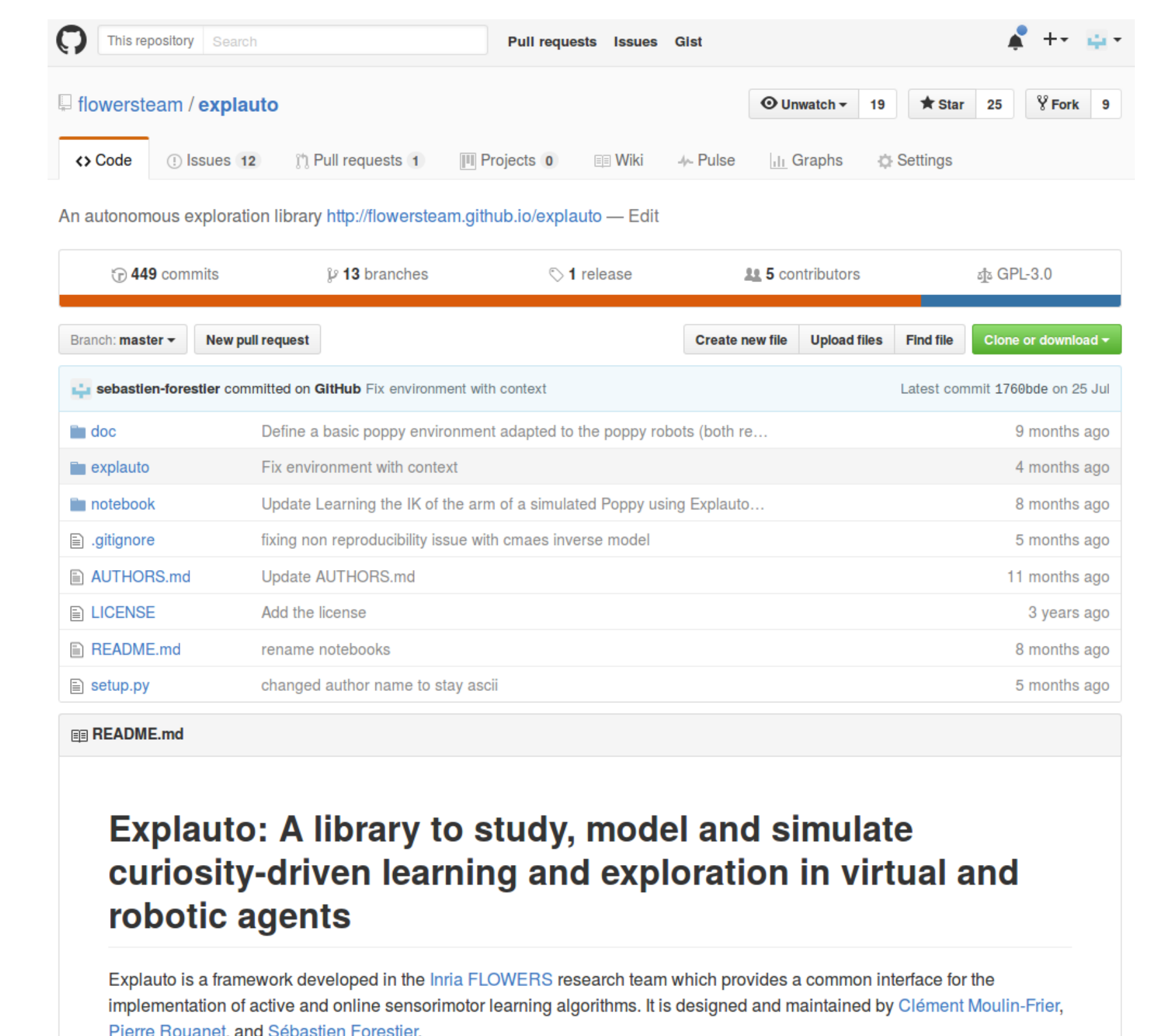
Explauto: a library to study learning in robotic agents

Explauto provides a high-level Python API for an easy definition of:

- Virtual and robotics setups
- Incremental learning of parameterized policies
- Active selection of parameterized RL problems

Explauto is **open-source** (GPLv3) and **cross-platform**: it has been tested on Linux, Windows and Mac OS.

```
from explauto.experiment import Experiment, make_settings
s = make_settings(environment='simple_arm',
                  babbling_mode='motor',
                  interest_model='random',
                  sensorimotor_model='nearest_neighbor')
expe = Experiment.from_settings(s)
```



github.com/flowersteam/explauto