

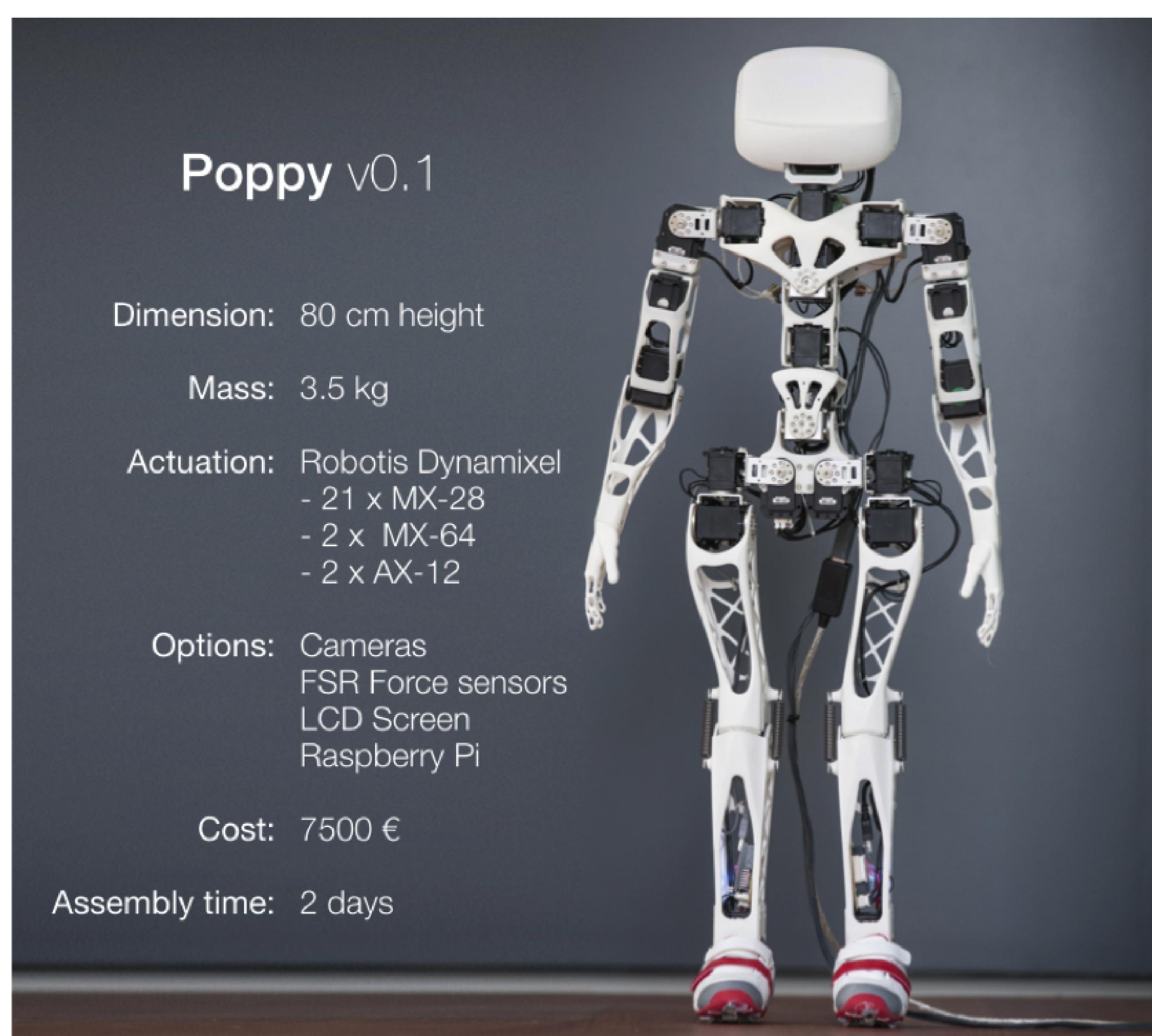
Poppy: Open Source 3D Printed Robot for Experiments in Developmental Robotics

Matthieu Lapeyre, Pierre Rouanet, Jonathan Grizou, Steve N'Guyen,
Alexandre Le Falher, Fabien Depraetere, Pierre-Yves Oudeyer
Flowers Team, INRIA / ENSTA ParisTech, France

Abstract

Poppy is the first complete open-source 3D printed humanoid platform. Robust and accessible, it allows scientists, students, geeks, engineers or artists to explore fast and easily the fabrication and programming of various robotic morphologies. Both hardware and software are open-source, and a web platform allows interdisciplinary contributions, sharing and collaborations.

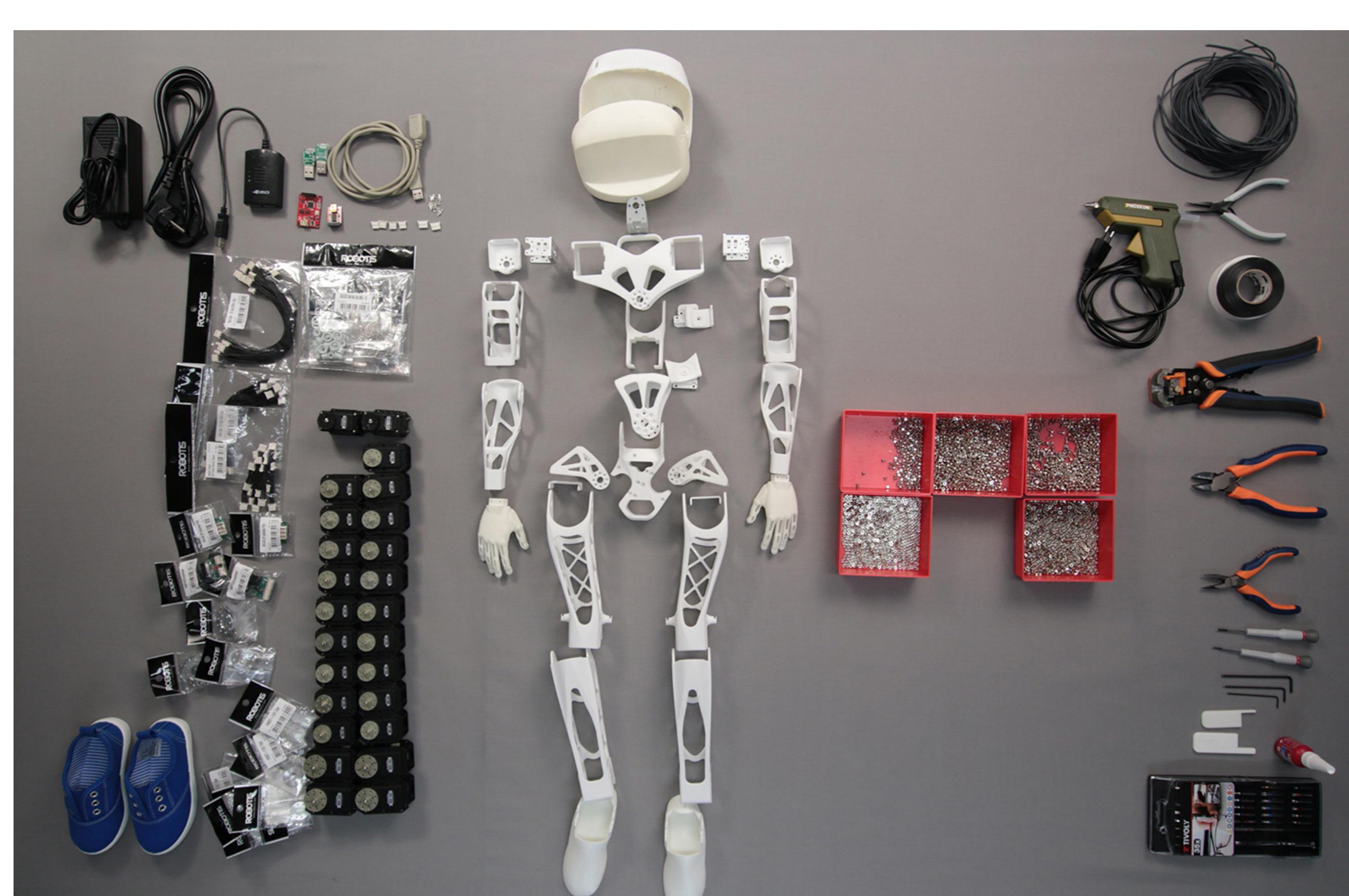
1. Overview



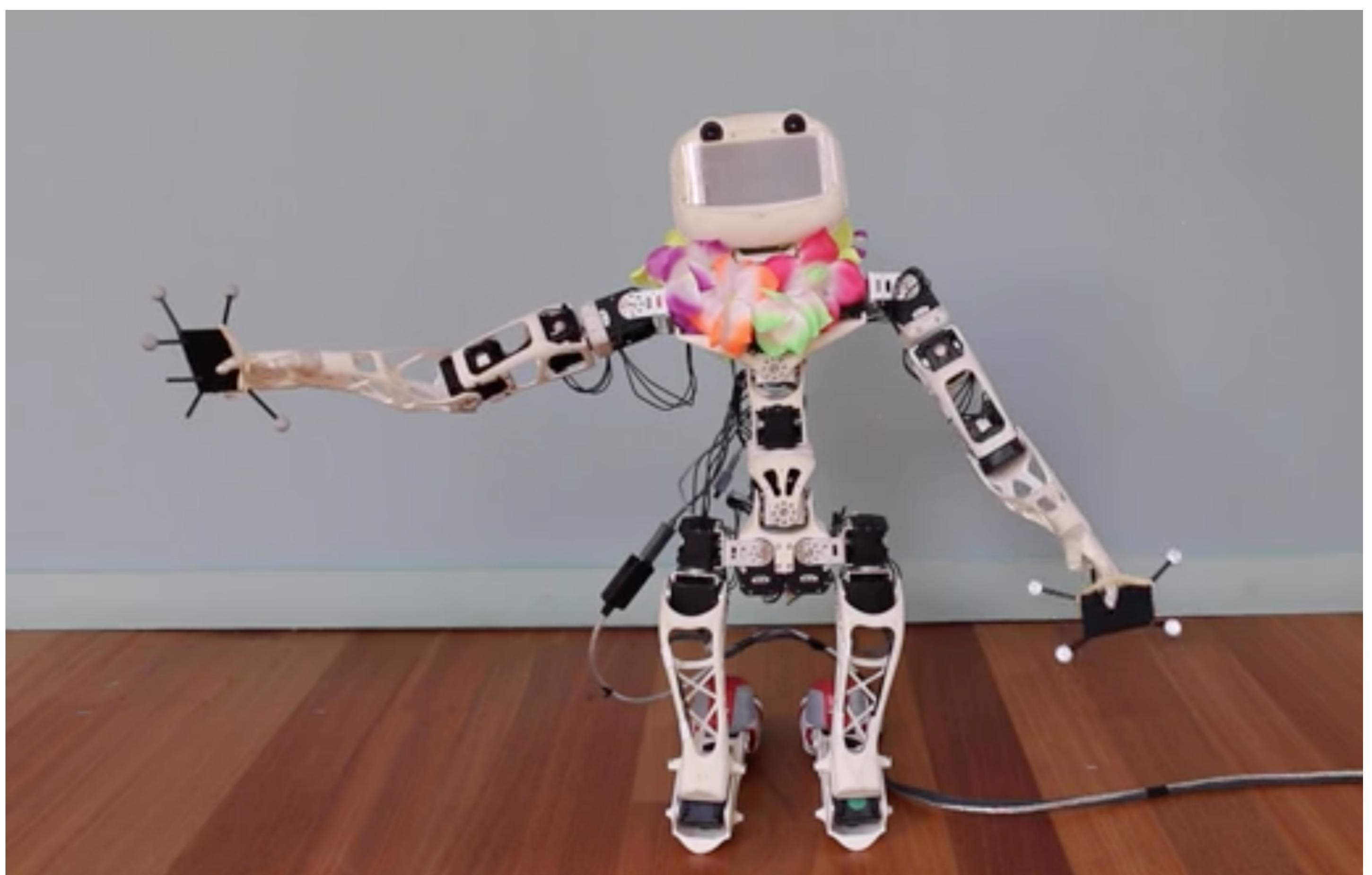
2. Reproducible research

Poppy is designed to conduct robotic experiments and integrate several key abilities in an easy-to-use robotic platform:

- **Easy To Duplicate:** The overall time to assemble all mechanic components of Poppy takes about 2 days. Adding extra sensors is simplified by the use of Arduino components.
- **Robustness and Lifelong Learning:** Poppy is designed to be robust to falls and to allow long experimentations (e.g. several hours). Also, its conception prevents it from destructing itself if wrong moves occur.
- **Easy To Setup:** We try to keep Poppy as Plug'n'Play as possible.
- **Affordable:** To make Poppy widely accessible, we keep the cost relatively low. You can afford all components for 7500-8000 Euros.



3. Scientific experiments



Poppy was used to compare motor versus goal babbling strategies when learning the inverse model of its arm. Thanks to the integration of pypot and explauto such an experiment can be quickly designed and realised [2].

4. Artistic experiments



The poppy platform has also been used in artistic dance performance.

5. More information

More information on the project can be found on our website www.poppy-project.org, in particular the current development of the platform is daily discussed on our forum: forum.poppy-project.org. Also all sources (hardware and software) of the Poppy project are distributed under open-sources licenses on our GitHub page [www.github.com/poppy-project/](https://github.com/poppy-project/).

6. References

- [1] M. Lapeyre, P. Rouanet, J. Grizou, S. Nguyen, F. Depraetere, A. Le Falher, and P.-Y. Oudeyer. Poppy project: Open-source fabrication of 3d printed humanoid robot for science, education and art. *Proceedings of Digital Intelligence*, 2014.
- [2] C. Moulin-Frier, P. Rouanet, and P.-Y. Oudeyer. Explauto: an open-source Python library to study autonomous exploration in developmental robotics. In *ICDL-Epirob - International Conference on Development and Learning, Epirob*, Genoa, Italie, 2014.