

The EPFL logo is in red, bold, sans-serif font. A large, thick red circular arc is positioned in the top right corner, and another similar arc is in the bottom left corner, framing the central text.

EPFL

Master/ Semester Project

Robotic Sculptures for Education

Directed by

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MOBOTS LAB

10/12/2023

ROBOTIC SCULPTURES

Introduction:

Robotics sculptures for K-12 education involve the creation of interactive, artistic structures that combine elements of robotics with aesthetic appeal. The exploration of this topic in the context of educational research, has been gaining attention, but it's still a relatively niche area compared to more traditional educational research topics.

Objectives:

Over the development of this project we will create a prototype based on the Thymio 2 hardware. From the design to the user experience (UX) we will discuss and work around the idea of using this kind of robots in educational setups. Thus we will have to achieve the following objective by the end of the project.

- Understand the state of the art, the purpose and the limitations of robotic sculptures.
- Iteratively design a robotic sculpture based on the hardware available on the Thymio 2 robot.
- Test, validate and document a handful of functionalities with a focus on education.
- Mid-semester and Final presentations.
- A functional prototype and user guide.

Literature Review:

- McNamara, Scott, et al. "LEGO brick sculptures and robotics in education." 1999 Annual Conference. 1999.
- Menegatti, Emanuele, et al. "A robotic sculpture speaking to people." Proceedings 2007 IEEE International Conference on Robotics and Automation. IEEE, 2007.
- Nakayasu, Akira. "Tentacle Flora: lifelike robotic sculpture." SIGGRAPH Asia 2018 Posters. 2018. 1-2.
- Kac, Eduardo. "Foundation and development of robotic art." Art Journal 56.3 (1997): 60-67.

Methodology:

During the development of the project, several methodologies will be used. In the design aspects, we will opt for an iterative process where we will learn from our mistakes, our prejudices and the natural evolution of the prototype, as well as its life cycle and its proposed uses. In terms of electronics, programming and integration of functionalities, we will start from a solid base, as the Thymio 2 robot has been validated by the educational community and already has many functionalities that we will have to understand and expand or exploit. In this project we will seek to keep the aesthetic side very present, for this we will have to rely on the experience of artists, such as Léa Marie Pereyre, and incorporate their points of view in our work.



Work Plan:

Based on the EPFL timeline, we will have weekly meetings and the student will have access to a desk to work.

Expected Results:

As the final result of this project we would have to produce a functional Robotic Sculpture Prototype and a well documented User Guide.

Significance and Innovation:

The use of robots in the classroom has continued to grow from the first robotic toys in the early 1950s to the emergence of educational robotics kits in the 1980s. The format of these robots, however, has not changed significantly. Two models appear on the market as the only ones capable of standing the test of time. On the one hand, the super flexible LEGO kits. And on the other hand, the two-wheeled robots. We propose to explore the creation of robotic materials with educational functionalities that allow a minimum degree of modularity, connectivity and programmability. The use of Robotic Sculptures could be an innovative format since their use has been scarce and has not been focused on the field of education.

Resources:

MOBOTS LAB will provide this project with all the resources needed to carry it out.

Ethical Considerations:

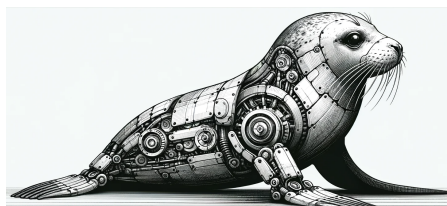
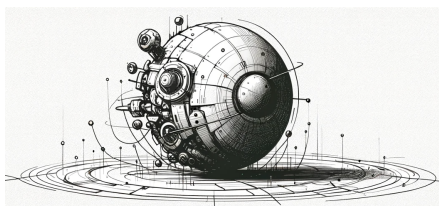
The selection of the student who will end up carrying out this project will be based both on his/her qualification to develop all parts of the project and on his/her motivation and interest to carry it out.

Budget:

This project is not funded. Masters students will be given priority.

Who should apply:

You should apply to this semester project if you are a student and you have a deep interest in art/design/aesthetics, education and robotics (making things by your).

Inspirations:

Manuel BL

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