European Project Semester

PROJECT OUTLINE

Project dates: September - December 2025	
Title: Control of Soft Crutches	

Project activity areas: Soft Robotics, Programming, Medical Care	**Keywords:** Soft Mechatronics, Testing, Medical Application, Machine Learning
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Project technical background:

Most of the time, disabled persons with walking problems use crutches. They trade a gain of locomotion with a loss of manipulation dexterity.

In a previous EPS project, a new kind of crutches was developed to propose an alternative to existing devices. This project aims to continue the development and integrate "intelligence" in it.

The idea is to embed sensors to get information about the wearer when he is walking with the crutches. Those data will be used to quantify the interaction of the devise with its user and the ground, but also to modify the form and stiffness of the interaction surfaces with silicon chambers.

First, pneumatic chambers and sensors will need to be implemented. Walking experiments to gather data should be performed. They will be used with machine learning to enhance the functioning of the crutches.

https://www.walkingsticks.co.uk/md-adjustable-forearm-crutches-pair.html

https://www.runmag.fr/les-premieres-semelles-connectees-digitsole.html

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Studied topics:

- State of the art about soft actuations and walking patterns.
- Design of the soft interface of the crutches of necessary components.
- Testing prototype and gathering data.
- Analyze the data and the walking pattern of a user using crutches.
- Enhancing the functioning using machine learning and walking patterns.