European Project Semester

PROJECT OUTLINE

Project dates: September – December 2024

Title: Design, Fabrication and Control of Soft Crutches

Project activity areas: Soft Robotics, Mechatronics, Medical Care,

Keywords: Soft Mechatronics, CAD, Prototyping, Medical Application, Machine Learning

Tutor's name and coordinates
Client – End-user: LGP-ENIT
ENIT Technical Supervisor + contact:
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Project origin
ENIT

Project technical background:

Disabled persons with problems for walking use most of the time crutches. They trade a gain of locomotion with a loss of manipulation dexterity.

This project aims to develop a new kind of crutches based on soft robotics. Those will allow the user to keep his hand mobility and increase his safety when moving on complex ground. One idea is to use pneumatic actuators and silicon chambers as interfaces between the crutches and their wearer and between them and the ground.

The project will use the different facilities offered by our School (3D printers, manufacturing machines, etc.).

The project will start with studying the existing technologies and choosing the modifications to be introduced into the crutches. CAD design and fabrication will follow to succeed in fabricating a prototype. You will perform validation tests. If there is enough time, you may implement some command laws using machine learning and walking patterns.

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

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Studied topics:

- Definition of requirements and technical specifications.
- State of the art about soft actuations and walking patterns.
- Design of the soft interface of the crutches of necessary components.
- Fabrication of a prototype.
- Validation experiments of the soft parts.
- Enhancing the functioning using Machine learning and walking patterns.