

Bachelor Thesis Proposal

Demonstrator application to control the OSL

Embedded Mechatronic Systems (Prof. Schütz) - Project EmKIPro²

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Background

The Open-Source Leg (OSL) is an active prosthesis developed by the University of Michigan to encourage international collaboration on innovating the field of lower limb prostheses. It is designed to be used by individuals with an above the knee amputation. By being open-source, each individual can order the parts themselves and build their own version of the OSL. The leg consists of two motors, representing the ankle and knee joints, and multiple sensors including but not limited to a load cell and an IMU.

In the EMSy lab, we have built a version of the OSL using mostly European-sourced parts. Furthermore, the battery management system has been improved, and many housing components have been added.

Project Description

The goal of this project is to create an application that can connect to the OSL's on-board Raspberry Pi and demonstrate various functionalities. Currently, a device needs to be connected to the generated WiFi signal and multiple independent commands need to be sent to the OSL. This makes it quite difficult for anyone inexperienced in the inner functionalities of the OSL or command line interface, making it hard to bring it to exhibits and promo events. Therefore, at the end of this project, a simple interface should be done with different buttons to show what the OSL can do that can be used by anyone, regardless of their technological skills.

Tasks

Below are some example tasks that you will have to perform. These tasks can be discussed and expanded to best fit the needs of the project and the interest of the student.

- Overview of current functionalities of the OSL and how to access them
- Creation of a script and or (web) application to connect to the on-board Raspberry Pi, initialize the OSL, and control various functionalities
- Provide a finished product that can be used to demonstrate the OSL at various events
- Write and present the thesis

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