Hochschule Kaiserslautern University of Applied Sciences
Angewandte Ingenieurwissenschaften Kaiserslautern

EMSy Embedded Mechatronic Systems

Master Thesis Proposal

Human to Prosthesis Motion Control System

Embedded Mechatronic Systems (Prof. Schütz) - Project Open-Source Leg

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Background

The Open-Source Leg (OSL) is an active prosthesis developped 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 a load cell and an IMU.

Project Description

This project consists of creating a control mechanism for the OSL using data from a video feed or a motion capture system. The idea is to extract the joint positions of a person walking and translate it into motor instructions to reproduce the movements on the OSL. Initially this can be done in an offline manner, but ideally the OSL reacts in quasi real-time to the person walking.

Tasks

Below are some example tasks that the student 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.

- Perform a literary review on human to prosthesis control systems
- Get familiar with how the OSL works and how to control the motors
- Process the image or MoCap data
- Implement the algorithm both off- and online
- Document the process appropriately
- Write the thesis

Contact

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