myoswiss

Discovery Program: Modelling of a Soft Exoskeleton

Description:

Wearable assistive technologies, such as exoskeletons, are often the best option to regain mobility for those with a weakness of the musculoskeletal system. In this project we want to simulate a soft wearable exoskeleton and its controls in a virtual environment.

Project Background Weakness of the musculoskeletal system can cause movement problems that decrease the quality of life of a person. This weakness may be the result of genetic disorders, a neurological condition or injury, or simply healthy ageing. Unfortunately, many of these conditions cannot be healed with the current state of medical care available. As a result, the best option to regain mobility is the use of assistive technologies. At ETH Zurich SpinOff MyoSwiss we are creating the Myosuit: a novel technology that combines robotics and functional textiles to provide users with an extra layer of wearable muscles to support their activities of daily life.

The unique quality of the Myosuit is its ability to assist a wide range of different users with a one size fits all design. The Myosuit must adapt its assistance profiles to every user individually irrespective of their particular disability, physiological parameters or gait deficiencies. In this project we aim to develop a virtual model of the Myosuit to better understand how the novel control approaches impact the timing of the assistance profiles and affect the human-robot interface.

Your tasks: Your task in this project is to develop the first generation virtual model for a wearable soft exoskeleton. The exact definition of the tasks and their order will be defined together with you according to your personal interests as well as the overall goal of the project.

Example project schedule could be:
Familiarization with the previous human-robot interface models of the Myosuit
Literature research
System Modeling of the Myosuit in a 3D simulator environment
theoretical validation of the model (performance / stability)

Your Benefits: In this project you will have full access to a novel exoskeleton. You will work closely with the development teams at ETH Zurich as well as MyoSwiss AG. Because of its early stages, the project is rather open ended and you will have full freedom to explore creative modeling approaches and solutions

Requirements:

Your Profile Required Skills
- motivated
- autonomous
- interest and theoretic knowledge in system modelling
- very good understanding of multibody systems
- having taken Robot Dynamics lecture at ETH Zurich

Desired Skills
- practical experience with C++
- practical experience with ROS
- practical experience with GIT

Other information:

Duration: 6 months
Starting date: February
Affiliated ETHZ Lab: Sensory-Motor Systems lab

Apply:

Contact Details If you are interested in the project please apply with your CV, academic transcript, and a short description of your interest in the project to:

Yves Zimmermann (yvesz@ethz.ch)

and/or Gleb koginov (gkoginov@ethz.ch)

State the name of the position in the subject of the email.