Thesis Project Form

Title (tentative):   Development of a simulation analytical model for a human-exoskeleton interface in operational

contexts.

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Description

Motivation and application domain

The study focuses on the development of an analytical model for the assessment of the performances of a lower-limb exoskeleton in the context of risky or load-intense industrial applications.

General objectives and main activities

General Objectives and Main Activities: The long-term goal of the project is the characterization of an interface between a muscoloskeletal model provided in the OpenSim software and the LEX (Light Exoskeleton) model provided by the Robosuits company, with particular focus on the gait cycle task with the presence of additional load on the subject. The quantitative evaluation of the LEX performances will be carried out using marker-based acquisitions in the Unige Labs and the collected data will be used to detect differences in parameters used for the evaluation of the performances.

Training Objectives (technical/analytical tools, experimental methodologies)

Training Objectives: The students will learn:
1. How to use a software for the simulation of muscoloskeletal models (i.e. OpenSim Environnment).
2. How to deal with an Exoskeleton CAD model and how to import it in the OpenSim Environnment.
3. How to extract meaningful parameters for the evaluiation of the performance of the subject with and without the presence of the Exoskeleton.
4. How to perform a marker-based data acquisition.
5. How to deal with different programming languages (i.e.: XML, Python).

Place(s) where the thesis work will be carried out:

Additional information

Pre-requisite abilities/skills: DIBRIS; unige; Robosuits SRL

Maximum number of students: 2