A robotically aided method for characterization of the mechanical behavior of patients

With the appearance of robotic assistance in rehabilitation there is a need to automatically extract information on the biomechanic state of the patient. Robots are being prepared to help physiotherapists to repeat simple motions, for the patients to learn basic tasks again. The advantage of the robot is that it never gets tired. The challenge is that the robot needs to be configured to take over the actions of a human manipulator.

In this process, it is important that the robot can 'feel' the patient, not only for security reasons, but also to determine the amount of help that the patient requires to move, and to detect the allowable range of motion.

By using data-driven modeling, possibly combined with machine learning, the goal of this thesis

is to characterise the patient's dynamic mechanical behaviour by using robotic manipulators. The challenges will lie in designing informative experiments such that the **mechanical properties of the human's joints can be extracted from the data**. Possibly, equivalent mechanical models of the human will be set up, describing him/her as an interconnection of (mechanical) impedances, such as inertial, damping and stiffness elements, to be identified from the experimental data.

Interested? Do not hesitate to contact us for more information.

Prerequisites: C++, Python, Matlab

Advisors: John Lataire, Kevin Langlois, Joris De Winter, Greet Van de Perre

Promotor: John Lataire, Greet Van de Perre

For more information please contact : john.lataire@vub.be kevin.langlois@vub.be