Segmentation of stairs ascent and descent for neuroprosthetic motor control

Alexis Fretes; Luis Prieto; Martín Teruel; Ulisses Clemotte; Fernando Brunetti

Abstract

The work presents the development of a segmentation algorithm for stairs ascent and descent. The algorithm is based on a Finite State Machine that uses leg angular position and linear acceleration in order in the sagittal plane to detect 4 different subphases of each activity. The algorithm was implemented in a neuroprosthetic device and was validated in realtime with 6 healthy subjects and different negotiating speeds. This type of algorithm allows motor neuroprostheses to stimulate muscle groups properly in order to assist motor tasks during daily life activities or rehabilitation therapies.