Balancing Adaptive Cooperative Technology

Fact Sheet

Project Information

BalancingACT
Grant agreement ID: 101106071

Funded under
Marie Skłodowska-Curie Actions (MSCA)

DOI
10.3030/101106071

Total cost
€ 0,00

EU contribution
€ 187 624,32

Coordinated by
ERASMUS UNIVERSITAIR MEDISCH CENTRUM ROTTERDAM
Netherlands

Start date
1 August 2023

End date
31 July 2025

Objective

Balance impairment affects a large proportion of the global population, as a symptom of many neurological diseases and a consequence of advanced age. Methods to improve balance through rehabilitation or assistive devices are effective but are limited by the availability of physiotherapists or by the strength and agility of the patient. While robotic assistive devices could augment mobility, extensive training is often necessary to receive the full benefits. BalancingACT will tackle this bottleneck by investigating methods to facilitate co-adaptation of user and balance assistance, providing personalized assistance directly targeting balance outcomes. The GyBAR, a gyrosopic backpack, has improved standing and walking balance for both healthy and stroke populations, but could benefit from targeted user training.
BalancingACT will address three main aspects of human-robot co-adaptation. I will first examine existing datasets from healthy and patient populations to determine which balance metrics explain differences between populations, providing a measure to gauge and optimize human-robot co-adaptation. I will then probe methods to improve motor learning for a healthy population in a challenging task, i.e. walking along a narrow beam. Exploration, driven by the individual or by the device, is a vital component of early learning. I will conduct two experiments, one to understand how self-guided exploration affects learning and one using human-in-the-loop optimization, a method to customize assistance by directly estimating the user’s response to a variety of candidate controllers, to determine the benefits of device-led exploration. This algorithm has previously elicited positive learning effects in exoskeletons and can also provide insight into the third aspect of co-adaptation: adapting the device to the user. In the long term, these results can be used to not only improve outcomes for the GyBAR but can also be generalized to other balance assistive devices.

Fields of science

medical and health sciences → clinical medicine → physiotherapy
medical and health sciences → basic medicine → neurology → stroke

Keywords

rehabilitation, balance, motor learning, robotics

Programme(s)

HORIZON.1.2 - Marie Skłodowska-Curie Actions (MSCA) MAIN PROGRAMME

Topic(s)

HORIZON-MSCA-2022-PF-01-01 - MSCA Postdoctoral Fellowships 2022

Call for proposal

HORIZON-MSCA-2022-PF-01
Funding Scheme

HORIZON-TMA-MSCA-PF-EF - HORIZON TMA MSCA Postdoctoral Fellowships - European Fellowships

Coordinator

ERASMUS UNIVERSITAIR MEDISCH CENTRUM ROTTERDAM

Net EU contribution
€ 187 624,32

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Region
West-Nederland > Zuid-Holland > Groot-Rijnmond

Activity type
Higher or Secondary Education Establishments

Links

Contact the organisation
Website
Participation in EU R&I programmes
HORIZON collaboration network

Other funding
€ 0,00

EC signature date 10 July 2023
Last update: 14 July 2023

Permalink: https://cordis.europa.eu/project/id/101106071

European Union, 2023