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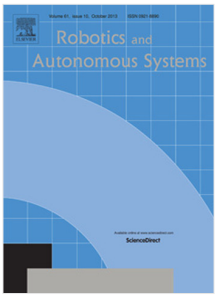

A human-machine-centered design method for (powered) lower limb prosthetics

P. Beckerle, O. Christ, T. Schürmann, J. Vogt, O. von Stryk,
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A human-machine-centered design method for (powered) lower limb prosthetics

P. Beckerle[a,b,*], O. Christ[c,d], T. Schürmann[a,e], J. Vogt[a,e], O. von Stryk[a,f], S. Rinderknecht[a,b]

[a] *Technische Universität Darmstadt, Germany*
[b] *Institute for Mechatronic Systems in Mechanical Engineering*
[c] *University of Applied Sciences Northwestern Switzerland, Olten, Switzerland*
[d] *Institute Humans in Complex Systems*
[e] *Work and Engineering Psychology Group*
[f] *Simulation, Systems Optimization and Robotics Group*

Abstract

This paper proposes a human-machine-centered approach to lower limb prosthetic design. The approach is based on a profound analysis and modeling of human factors from user and expert survey data. With this knowledge, user demands are considered in the prioritization of technical requirements. To evaluate the design framework, it is applied to the example of the design of a powered prosthetic knee. Key result of this application are a distinct changes in technical requirement priorities that might yield completely different prosthetic designs. Thereby, the potential of the proposed method is substantiated while a practical evaluation is aspect to future studies. Beyond this, the method is easily transferable to other robotic devices operating close to their users, e.g., exoskeletons or teleoperators.

Keywords: `Design methods, human factors, prosthesis, motion assistance, wearable robotics`

*Corresponding author
Email address: `beckerle@ims.tu-darmstadt.de` (P. Beckerle)