

The Chair of Information-oriented Control (ITR) is seeking for a

## PhD candidate or PostDoc in "Shared control"

The successful candidate will participate in the research project "*Rehabilitation based on Hybrid neuroprosthesis*" (ReHyb) supported by the EU Horizon2020 program, developing novel concepts for cooperative control based on data-driven human models and machine learning with application in smart human-machine interaction.

Project description: Advancements in mechanical engineering and automation technologies have led to global expectations for robotic devices in rehabilitation. In contrast to classical physical therapists, robotic systems are able to tirelessly and precisely apply intense manual labour, while accurately measuring performance and improvements of the patient. Active exoskeletons meet these requirements and possess the additional advantage of non-stationary design that allows for flexible training and mobility of the patient. Preliminary studies indicate that the training efficiency can be improved if, in addition to the guidance by the exoskeleton, the users motor functions are actively controlled using functional electrical stimulation (FES). Such hybrid systems are beneficial because the users' own muscular activity initialise the movements and are not passively guided through an external force. However, the required control which coordinates the active exoskeleton and stimulation for the human motor functions, especially in terms of dexterity skills necessary for activities of daily living, is more complex due to the unsolved questions on shared control and the missing models of the human motor function with respect to FES. Thus, ReHyb designs an upper-body hybrid neuroprosthesis using cooperative control based on data-driven system identification and estimation of the internal human states.

For this project, we are seeking a motivated and talented researcher with strong disciplinary background in control, machine learning and mechatronics and a strong interest to work in an interdisciplinary environment. Additionally, the candidate should have good knowledge in robotics, biomechanics and optimization as well as strong software development skills. Candidates should have very good English language skills, knowledge of German is not mandatory.

The position is fully paid according to the German rules (13 TV-L). Requirements are a successful degree (master/diploma/doctoral/PhD) with exceptional records.

Please send your application including your complete CV, grades, relevant certificates, and some of your publications in a single pdf file by email to

office@itr.ei.tum.de with the keyword 'ReHyb-SharedControl'.

TUM is especially encouraging minorities and women to apply, because of its strong commitment to diversity in engineering education, research, and practice.

We are looking forward to hearing from you.

### Technical University of Munich

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