

# Task Description

Student Research Project (Studienarbeit)

## Designing a user interface system for seamless interaction with a Rehabilitation Robot

At the Institute for Medical device Technology (IMT), there is an availability of a student research project (Studienarbeit), aiming at the design and development a user interface system for a rehabilitation robot with 2 Degrees of Freedom (DOF). This project is required to gather user requirements which includes understanding the needs, goals, and limitations of the users (such as patients, therapists, or caregivers) and implementing a visual or auditory feedback mechanism. Additionally, the user interface system must provide options to customize the user interface based on individual needs and abilities. The system must adjust joint angles and velocities to match the patient's requirements. Conclusively, ensuring proper integration of the user interface with the ankle rehabilitation robot's hardware and software components is mandatory. As is seen below, Fig. 1 illustrates important principles of a user interface design, and Fig.2 illustrates a CAD model of a developed Ankle Rehabilitation robotic System (ARRS) at IMT.

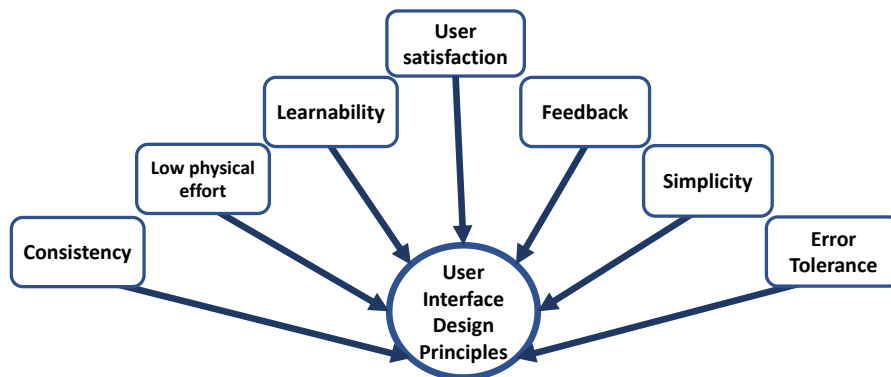


Figure 1: Key interface elements, adopted from Farhab Ahmend Siddiqui, et al.; 2019

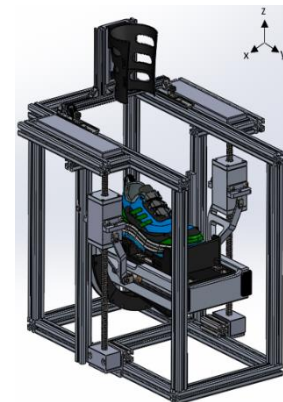


Figure 2: CAD model of a 2 DOF ARRS, SA 0197, P. Birchinger, IMT, University of Stuttgart, 2023

Aim of your thesis:

- to design and develop the user interface, and integrate the system
- to validate and test the system

The following requirements would be ideal for the prospective student:

- basic knowledge of interface design and prototyping
- basic knowledge of microcontrollers, Axure RP, or other wireframing softwares

Supervision will be provided in English. Hence, the thesis should be written in English. In case of interest please contact P. Shah Nazar at [peiman.shahnazar@imt.uni-stuttgart.de](mailto:peiman.shahnazar@imt.uni-stuttgart.de)

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