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F O R S C H U N G S P R A X I S

for

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Problem description:

Even today, an increase in average age and elderly people represents a major challenge to modern societies. In near future those problems will increase drastically especially for Germany as it harbours a major imbalance in age composition.
To support people in their everyday worklife and thus reducing injuries and other disorders resulting of imbalanced strain is a major task in future societies.
Tackling those tasks from an engineering point of view has lead to the development of several different exoskeletons.
At Fraunhofer IPA an actual elbow orthosis based on complient actors [2] is currently in development as part of the ICON Project [1]

In this work, the student has to develop a framework to control an existing prototype of a power orthosis with complient actors.
Therefor a reliable execution environment ist of utmost importance, as well as a reliable communications method (i.e. EtherCAT).
Another task consists of implmenting several control algorithms and measuring their performance.[3]

Work schedule:

- Develop a control infrastructure for a power orthosis
- Communication via Ethercat/ROS
- Establish a realtime save execution environment (i.e. realtime Linux)
- Implement various control algorithms and test their performance

Bibliography:

[1] ICON Project https://www.fraunhofer.de/de/presse/presseinformationen/2015/Dezember/fraunhofer-und-universitaet-auckland-kooperieren.html
[2] Pratt, G.A. and Williamson, M.M. Series elastic actuators *Proceedings 1995 IEEE/RSJ International Conference on Intelligent Robots and Systems. Human Robot Interaction and Cooperative Robots*
[3] Siciliano, Bruno, Khatib, Oussama (Eds.) Springer Handbook of Robotics

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