

Masterarbeit

Title: Integrating Motionplanning for Platform and Arm Movements

Topics: Cognitive Robotics, Manipulation

Abstract:

Today we have a mobile robotic platform with arms, which mainly is used for static manipulation tasks. There are two individual systems for navigation of the platform and for motion planning of the robotic arm. For the navigation, we use an evolutionary optimization approach, which is voting for individual motion commands according to different objective functions, depending on the resulting movement trajectory [1]. For the arm, a roadmap based motion planner [2] is used, which also relies on a evaluation of different objective functions and therefor has some conceptual equivalences.

Aim of this thesis is to integrate the navigation and arm motion planning in one system allowing to plan coordinated synchronous movements e.g. for passing a door while holding the door handle in the robot's hand.

To that end, first, we need to evaluate the possibilities for a synchronization of the two low level drive systems, which are running in separate software modules. If synchronous motion is possible, in a second task the high level planner for the arm motion has to be extended in a form that reuses of existing software modules for 2D path planning and trajectory evaluation.

Literatur:

- [1] Müller, St., Trinh, T. Q., Gross, H.-M. Local Real-Time Motion Planning Using Evolutionary Optimization. in: Towards Autonomous Robotic Systems (TAROS), UK, LNCS Vol. 10454, pp. 211-221, Springer 2017
- [2] Müller, St., Stephan, B., Gross, H.-M. MDP-based Motion Planning for Grasping in Dynamic Szenarios. in: Europ. Conf. on Mobile Robotics (ECMR), Bonn, Germany, 2021

Resources for further literature research:

- www.ieeeexplore.ieee.org (nur aus dem Uni-Netz bzw. via VPN)
- Google Scholar scholar.google.com
- Microsoft Academic Search academic.research.microsoft.com
- Proceedings of relevant conferences (CVPR, ICCV, ECCV, BMVC, AVSS, ICPR, ICIP, IROS, ICRA, ...)

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