

Research project / Student thesis

Integration of a time-optimal path-parameterization and reactive motion planning framework

Motivation

Time-optimal path tracking requires following a predefined geometric path while respecting the robot's kinematic and dynamic constraints. Accurate path following is crucial for tasks like welding or painting, where precision is vital. In scenarios where the robot moves freely, collision avoidance becomes equally important. Moreover, reducing cycle times for these tasks is often desired to improve efficiency, which is achieved through efficient path-parameterization.

While these methods work well for offline computed trajectories in static environments, dynamic environments require continuous replanning. To do so, methods for reactive motion are needed.

Task description

The tasks include integrating computer vision, inverse kinematics, path planning, path parameterization, and robot control. Each module has a well-defined theoretical foundation; the main task is to implement and integrate them efficiently.

Requirements

You have experience with C++ and ROS and have taken the courses Robotics 1 and 2.

Contact

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