SDU

International
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in Robotics & Entrepreneurship

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INDUSTRY CASE

#14_UR_B

Optimized motion performance (physical)

Context

UR strives to improve the quality of their cobots by utilizing cutting-edge technologies such as machine learning/AI. UR is currently investigating if machine learning can be applied to optimize the cycle time of the standard path primitives. Just between two pick & place poses, a linear path in Cartesian or joint space may not yield the best possible cycle time depending on the slowest axis. However, sharp cycle times are among the most important performance indicators delivered by robot manufacturers.

Palletizing as a typical pick & place scenario

Challenge

Develop a real-time capable machine learning solution for pose-to-pose paths of a physical UR robot transporting a variety of payloads (known and unknown) which can positively impact cycle times for poses across the workspace.

To get the team started, consider the following:

- Can solutions utilize known kinodynamic motion planners?
- Can solutions exploit data from force/torque sensor to estimate payload mass and inertia?

Keywords: Motion planning, velocity profile, acceleration profile

Tools, methods and materials

The challenge can be addressed with any machine learning tool allowing for generic data as input. Regarding the methods, motion planner libraries such as the Open Motion Planning Library contain typical reference implementations for kinodynamic solvers. The selection of tools and methods is left to the team.

From UR, the team will receive an UR robot arm and documentation on how to command user-defined motions and how to access data from the force/torque sensor. In addition, UR will be available to discuss details of the challenge along the way.

Universal Robots, a Teradyne company, is a leading provider of collaborative robots (cobots) used across a wide range of industries and in education. Founded in 2005 and headquartered in Odense, Denmark, Universal Robots aims to create a world where people work with robots, not like robots. Its mission is simple: Automation for anyone. Anywhere. We have a unique set of values that guide our decision-making at all levels of the organization. We inspire our employees and global network of partners to think differently and innovate ground-breaking technologies that move people, industries and the world forward.

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