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Metadata modelling of capabilities for ROS2 controlled robotic systems

Cyber-Physical Robotics

Masterthesis/Bachelorthesis

This thesis aims to analyze and implement methods of metadata modelling for the capabilities of ROS2 controlled robotic systems

Motivation

In today's fast-paced manufacturing environment, modular robotics offer a compelling solution to address the challenges of short production life cycles and increasing product variations. These adaptable systems can be quickly reconfigured to accommodate new designs and production requirements, significantly reducing downtime and enhancing flexibility.
However, the complexity of combining different robot modules necessitates sophisticated orchestration methods. The orchestration of manufacturing equipment is often based on advertised capabilities and services of the machines. In order to advertise these capabilities to an orchestration system the metadata modelling of such capabilities is necessary.

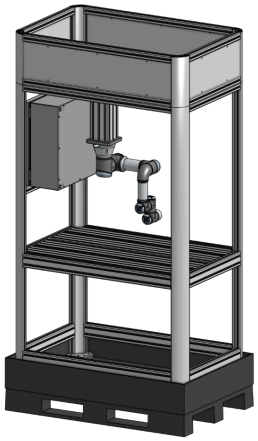

Abbildung 1: Robot Module

Aims

The aim of this thesis is to conduct an analysis and evaluation of metadata modelling methods for machine capabilities. Additionally, one method should be used to model the capabilities of an articulated robot, controlled with the Robot Operating System 2 (ROS2). The approach should then be validated by implementing an orchestration, which utilizes the advertised capabilities to commission the robotic system.

Abbildung 2: ROS2

Helpful prior knowledge

- Knowledge about robotic systems
- Knowledge about ROS2
- Knowledge about metadata modelling
- Lecture Cyber-Physical Production Systems

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