



Contribution ID: 166

Type: **Poster**

Six-axis robotic arm driver: Zoning out with Frappy and NICOS

Tuesday, 5 December 2023 14:00 (3 hours)

The Automatic Laue Sample Aligner (ALSA) uses a robotic arm (Mecademic Meca500 [1]), computer vision [2], and air suction to manipulate small crystal samples.

While controlling the robot arm, operating with the absolute reference frame of the robot would be quite confusing for the end user. Therefore, taking inspiration from Entangle [3] implementation, we have written a control driver using Frappy framework to communicate via SeCOP [4]. Our approach allows us to define zones (such as crystal pickup area or beam area), providing a local reference frame that is much easier to operate and perform linear movement.

The driver handles the movement between zones and the translation of the local coordinates seamlessly.

A NICOS integration is used to command the robotic arm to move between the defined zones, move within a zone, or read the current position. This is coupled with computer vision that detects the positions and shapes of the supplied crystal samples.

The driver is written in a general way as a reusable project that can be easily adapted for another application.

[1] <https://www.mecademic.com/meca500-industrial-robot-arm/>

[2] "Computer vision integration into the NICOS", poster of Tomáš Červeň, MLZ users 2023

[3] G. Brandl, <https://forge.frm2.tum.de/review/c/frm2/tango/entangle/+/21507>

[4] Kiefer, Klaus, et al. *Journal of Neutron Research* 21.3-4 (2019): 181-195.

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Session Classification: Poster Session

Track Classification: Neutron Methods