

Project proposal

Title: Robotic Arm Control
 Supervisor: Mr. Louis Munier (Rehassist Laboratory)
 Timeframe: Spring 2021

EPFL Xplore is an interdisciplinary project whose aim is to design and develop a Rover to participate in two international competitions: the University Rover Challenge and the European Rover Challenge. As part of 2 out of 4 missions, the rover will need to use a robotic arm to approach an object and grasp it by mean of its robotic arm.

Project description

Problematic

The goal of this project is to qualify the control architecture of the arm by means of the available hardware. The student will have at his/her disposal the main computer of the Rover (see ref [1]), two Maxon 3-axis motor controllers (see ref [2]) and 6 Maxon motors. The control of the arm has already been developed using the inverse kinematics model on Matlab and will be running on the main computer using ROS.

The purpose is to compare two configurations: one serial and one parallel as described on the following schematics.

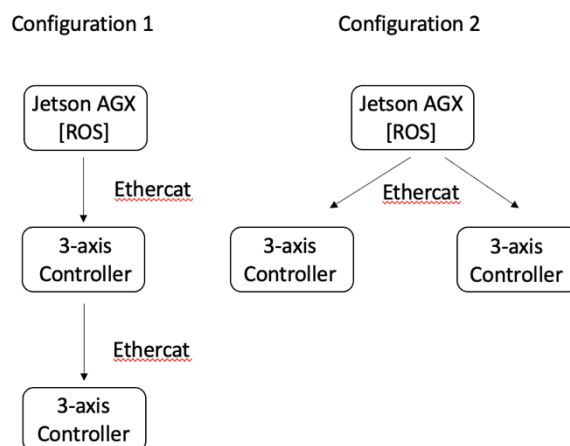


Figure 1 – Motor Control Configurations

Recommended

ROS knowledge

Means

For sequential uses, the algorithm is expected to run on a 8-core 2.3 GHz ARM CPU.
For parallelisable algorithms, a NVIDIA Jetson GPU unit is provided with at least 22 TFLOPs as processing power.
At least 16GB LPDDR4 memory will be at disposal.

Reference documents

- [1] NVIDIA Jetson Xavier AGX, <https://developer.nvidia.com/embedded/jetson-agx-xavier-developer-kit>.
- [2] Maxon EPOS4 Compact 24/5 EtherCAT 3-axes, <https://www.maxongroup.com/maxon/view/product/control/Positionierung/684519>.

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