Title: Mechatronics update and control architecture of a mobile base using ROS

Context:

The mobile base platform is a wheeled robot developed for the MBZIRC challenge (2017-UAE). The omnidirectional wheel and the innovative integration were patented [WO2018158445-PCT/EP2018/055214]. The mobile base integrates three omni wheels with BLDC motors which should be operated by ROS2.

Objectives of the internship:

• Understand the mobile base functioning mechanism, mechatronically update it and operate it on ROS2.
• Perform an update on the hardware components
• Build the control architecture of the mobile base, based on the EtherCAT as a communication protocol, for the connection between the microcontroller (slaves) and the PC (master) with the aim of controlling it by ROS (Robot Operating System).
• Control each of these motors using ROS2 and create a ROS2 package for the mobile base.

During the project, the candidate will explore different solutions and present a research proposal within two weeks, including a vision of the solution he intends to implement throughout the project cycle. Milestones will then be set to deliver parts of the project.

Required skills:

• Mechanical or electrical engineering background.
• Knowledge of C++ language or Python
• Understanding the principles of the ROS2.
• Microsoft Office suite (Word/Excel/Power point).
• Ability to work in a multidisciplinary team.
• English (Spoken and written).
Reference:
Alfayad, S.; Kardofaki, M.; Fouda, K. Omnidirectional Wheel and Vehicle Implementing Said Wheel, 2018

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