MAS-AI

SPIN ROBOTICS

CHALLENGES

Every day, **millions of screws and bolts** are mounted in the European manufacturing industry by employees with handheld screwdrivers. It is an expensive, time-consuming, and inefficient assembly process. As an example, a car is put together with more the 3000 screws. The repetitive work from manual screwdriving can cause physical disabilities and strain to the worker and reduce the working conditions.

THE SOLUTION

A **mobile robotics solution for assembly and dismantling demonstrator** was developed to address **Challenge #1** in the EARASHI project. The mobile robot assembly station is human-centric, fully collaborative and built to work alongside humans at the factory floor. With the **"teach-pen"**, positions in the robot program are easily taught both screw hole positions and alignment features.

In addition, the project has implemented **AI algorithms for increasing the torque accuracy** of the screwdriver tool attached the cobot which are applied to tighten and loosening screws. Traditionally, this torque is measured using an expensive and bulky, calibrated inline torque sensor that is an integrated part of the tool.

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RESULTS

The **AI models**, particularly the multi-timestep approaches, have shown promise in reducing noise and improving the accuracy of torque predictions, but they are still not capable of fully handling complex behaviours such as **torque ramp-up and ramp-down scenarios**. From the implemented AI model with 51 timesteps we succeeded to comply to all project defined KPIs.

While the **AI models** have not yet fully addressed the challenges in torque ramping, their development represents a promising **path forward**. With continued improvements in both the models and the tools for **recursive AI implementation in firmware**, we anticipate that AI will become a crucial tool in torque estimation, complementing and eventually enhancing the performance of analytical models.

IMPACT

By being a part of the EARASHI project, SpinRobotics has developed new core technology that are already impacting our customers in a positive direction. With better torque estimation models we can offer high performance screwdriving solutions for robots for a more affordable price compared to state of the art at the marked. We also received support in establish an overview of our **Eco-design processes** and potential.

GET IN TOUCH WITH MAS-AI

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EARASHI

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