Chaire MIAI Proof of Concept
SARA: Safe Adaptable Robotics Arm

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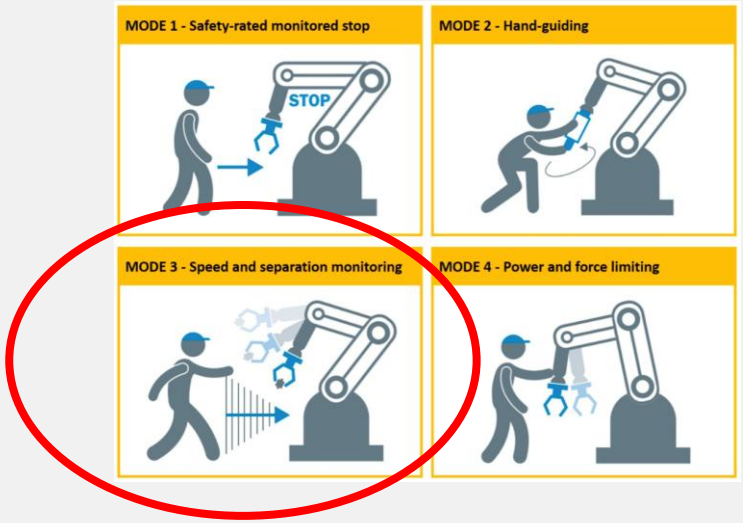
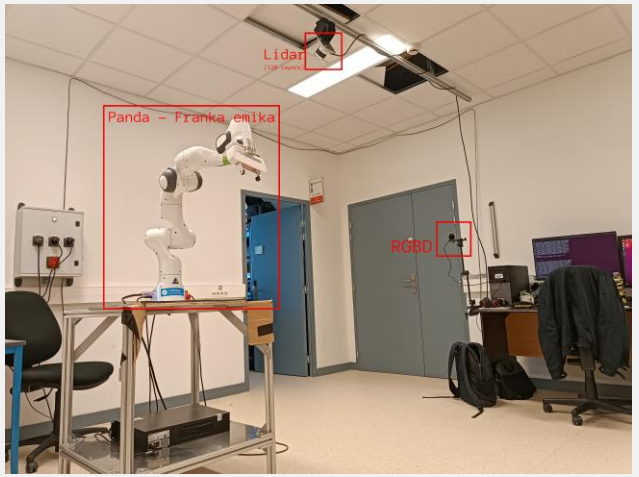
SARA: Safe Adaptable Robotics Arm

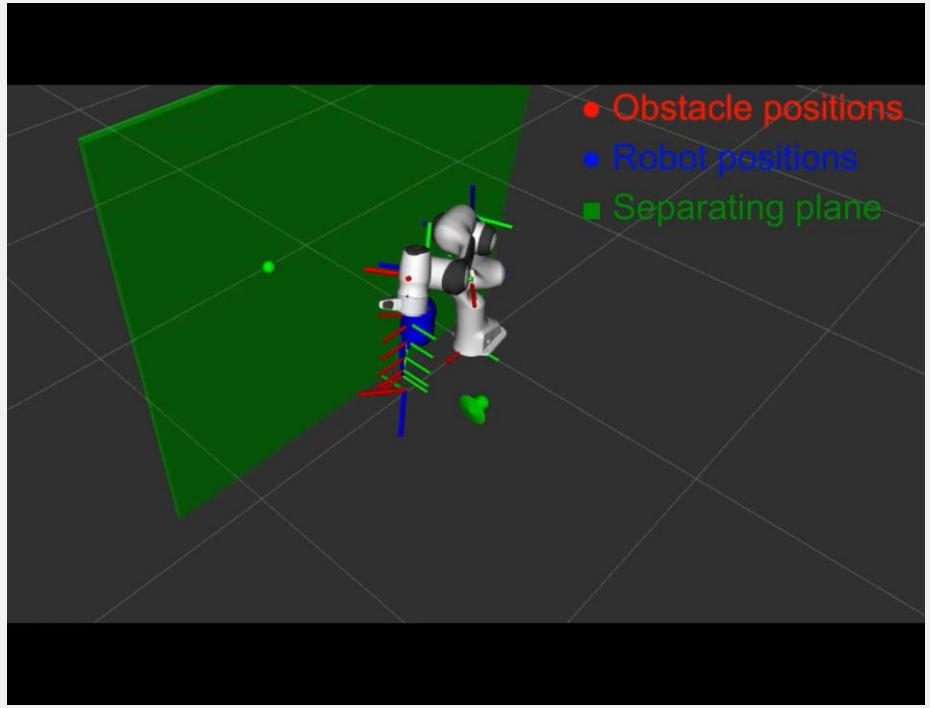
Safety of an operator sharing a workspace with a cobot (CDP CIRCULAR): ISO/TS 15066:2016 standard: specification of the safety requirements for collaboration between an operator and an industrial robot.





- A collaborative robot (ie, cobot) combined with a set of sensors that observe the scene and provide the operator's position as well as a short-term prediction of their motion;
- **The objective is to plan and execute, in real time, a trajectory allowing the cobot to reach its goal while avoiding the operator: predictive operator avoidance.**

SARA today: Safe and Acceptable Robotics Arm





- SARA « stand alone » (CDP BOOT + LSI Carnot)
  - ▶ Design and implementation of avoidance behaviors
  - ▶ Study of user acceptability and perception of these behaviors (140 participants)

- SARA « embedded » (I-Lab 2023)
  - ▶ Adaptation of SARA for the mobile robot Miroki (Enchanted Tools)
  - ▶ Transport of objects in hospitals environment

SARA in the future: Safe and Acceptable Robotics Arm

TRL 2-3 -> TRL5

- SARA « stand alone »
  - ▶ Definition of an industrial use case with ADTP
    - Adaptation of the current prototype
    - Testing in real-world conditions
    - Analysis of robustness and acceptability
  - ▶ **Moving toward a generic robotic arm control library for operation in human-shared environments**
  - ▶ Industrialization by Enchanted Tools

- SARA « embedded »
  - ▶ Definition of a hospital use case with Enchanted Tools
    - Adaptation of the current prototype
    - Testing in real-world conditions
    - Analysis of robustness and acceptability
  - ▶ The mobile robots Miroki designed by Enchanted Tools will be the first robots equipped with SARA

SARA: Safe and Acceptable Robotics Arm
Some references

Lopez, T. and Aycard, O. and Wieber, P-B. and Boua, M. and Jeoffrion, C. *Safe, Fluent and Acceptable Motion Generation and Execution for Human–Robot Interaction in Manufacturing Environments.* In IEEE International Conference on Robot and Human Interactive Communication (RO-MAN), 2026. **Best paper award.**

Video demonstrating the prototype in action : https://youtu.be/xaCTPUfj3cw?si=vnuvxecrEdcHalWc