

Chaire MIAI Proof of Concept

SARA: Safe Adaptable Robotics Arm

Olivier Aycard

Professor

Grenoble INP - PHELMA

Asimov (GIPSA Lab & INRIA)

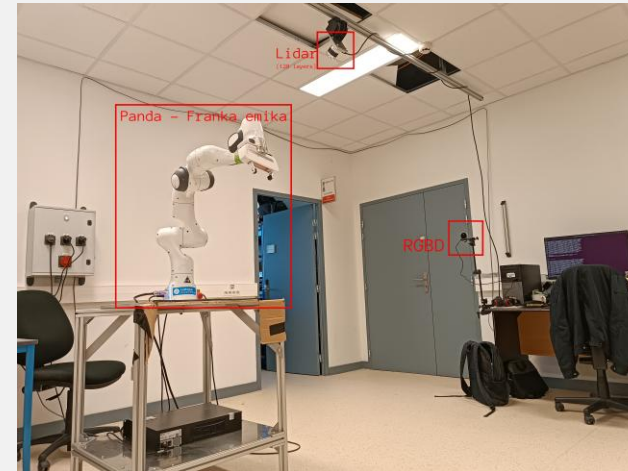
<https://olivier-aycard.github.io/>

olivier.aycard@grenoble-inp.fr



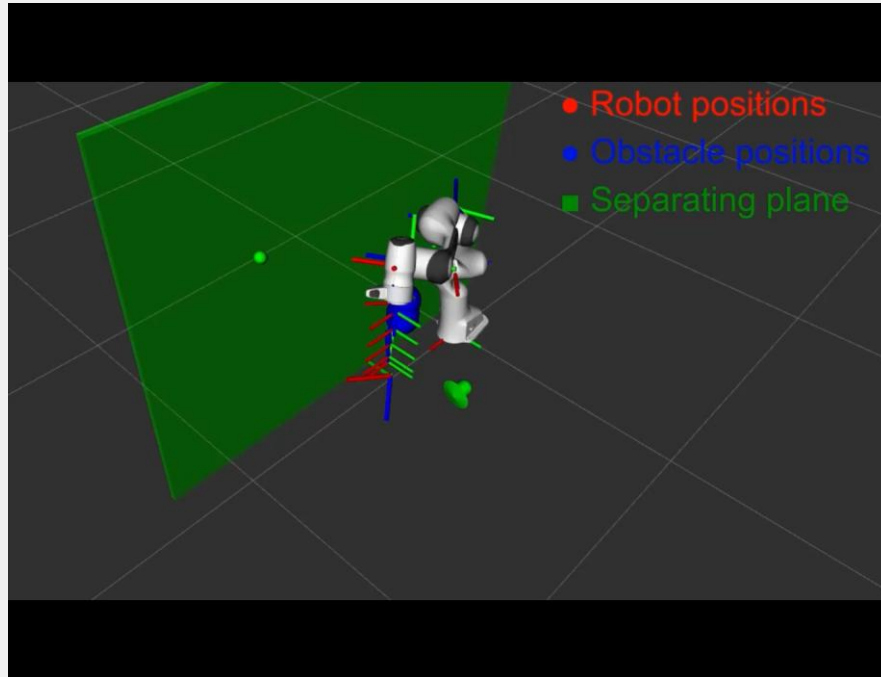
SARA: Safe Adaptable Robotics Arm

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**

