



A step further in collaborative robotics

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ABOUT SHAREWORK



Safe and effective human-robot cooperation towards a better competitiveness on current automation lack manufacturing processes

- 4 years duration, from 1/10/2018 to 31/10/2022
- Budget: 7,4 M€, 100% funded by the EC
- 15 participants from 6 different countries
- 4 use-cases
- Coordinated by Eurecat, RTO, ES



Railway



Automotive



Metal



Capital goods



OBJECTIVES



Sharework endows an industrial work environment of the necessary intelligence and methods for the effective adoption of HRC with no fences



Design an evolving knowledge base and semantic environment



Develop a human-aware dynamic task planning and scheduler system



Develop a human-aware robot off-line and real-time motion planner



Develop a multimodal human-robot communication system



Develop methods for overcoming human-related barriers and ensuring a successful integration

The technology developed will be proven and validated in four industrial scenarios in the railway, automotive, metal and capital goods industries.

IMPACT



Solution benefits

Task selection

Select the best tasks to be performed and their timing based on human task in execution.



Human-aware

Inform the human about the next action.

Multiple adjustments

Adjust varieties such as speed and strength to ensure the worker's safety.



Allows human input

Allows the human to make specific requests to the system.

On-going learner

Observe the worker task, recognize and learn it.



Improved ergonomics

Evaluate work ergonomics and provide posture corrections to workers.

DEVELOPMENT PHASES



System development



1

Analysis of the work environment and worker's needs.

2

Development of the necessary modules comprising Sharework system.

3

Preliminary system integration into a mock pilot to optimize system components.

4

Evaluation of functionalities and performance, as well as ergonomic, human-related factors and safety.



ALSTOM use case: Door and window frame

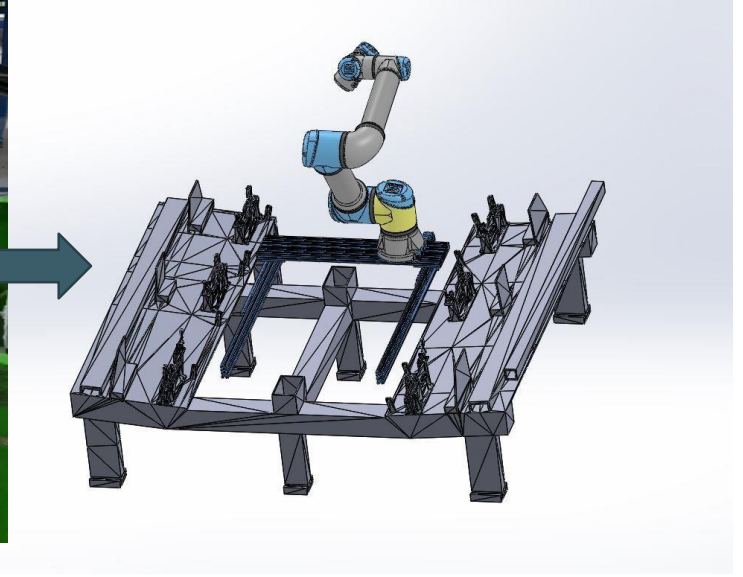
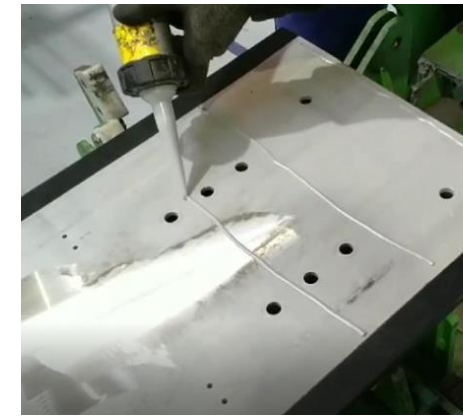
Silicone application

- Low value added task
- Control of the correct application inside the contact area
- Spatula needed to spread the silicone evenly
- Process repeated for each corner

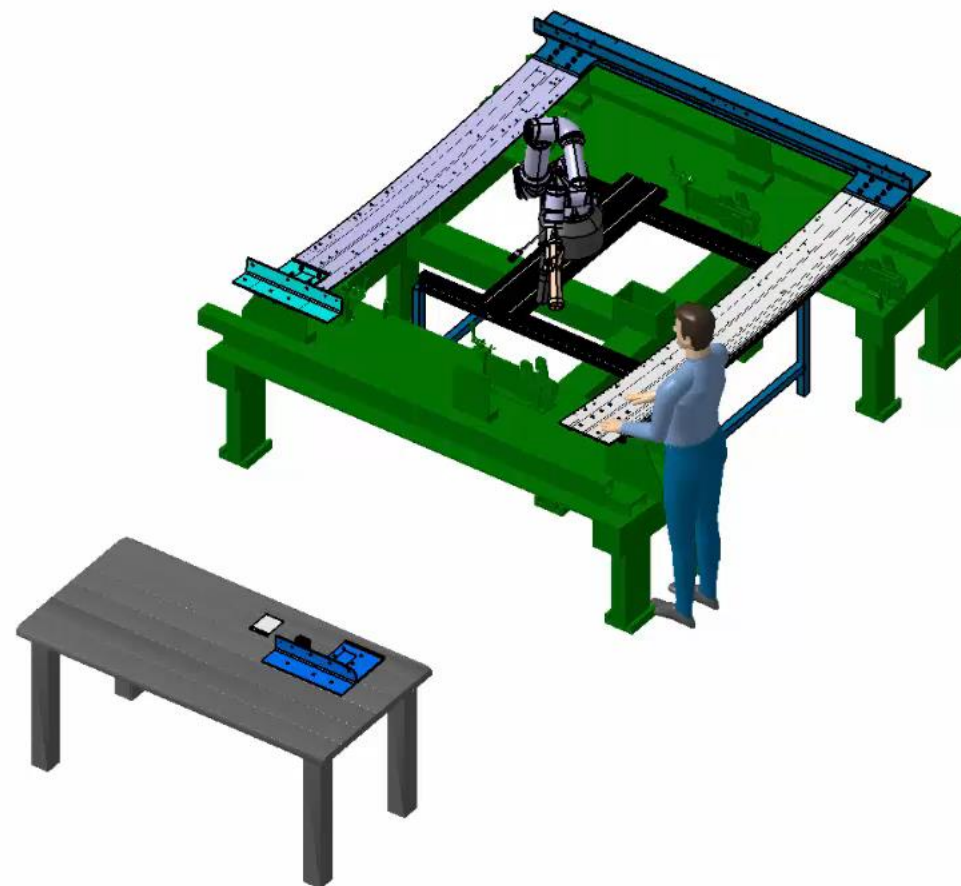


Riveting

- Low value added task
- Tool is heavy (5kg) and the recoil causes serious injuries after a prolonged utilization
- Process repeated for each corner



ALSTOM use case: Door and window frame

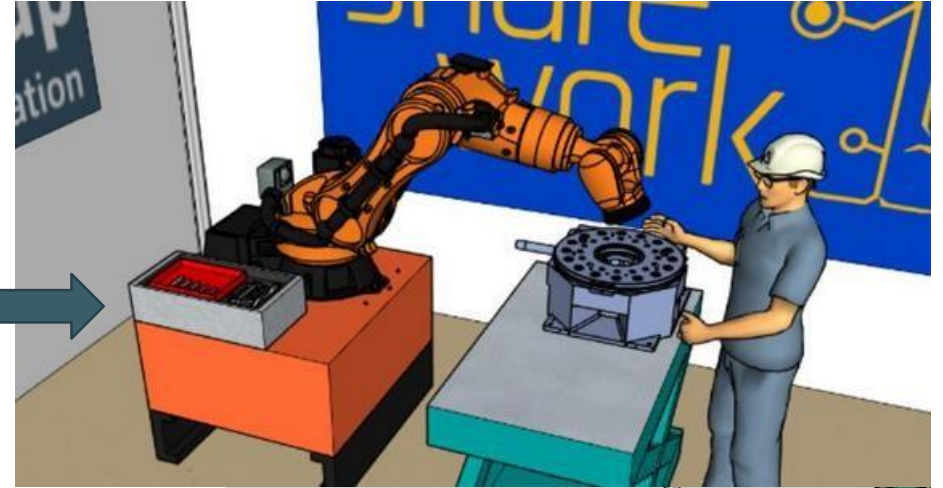




GOIZPER use case: Servo rotatory table

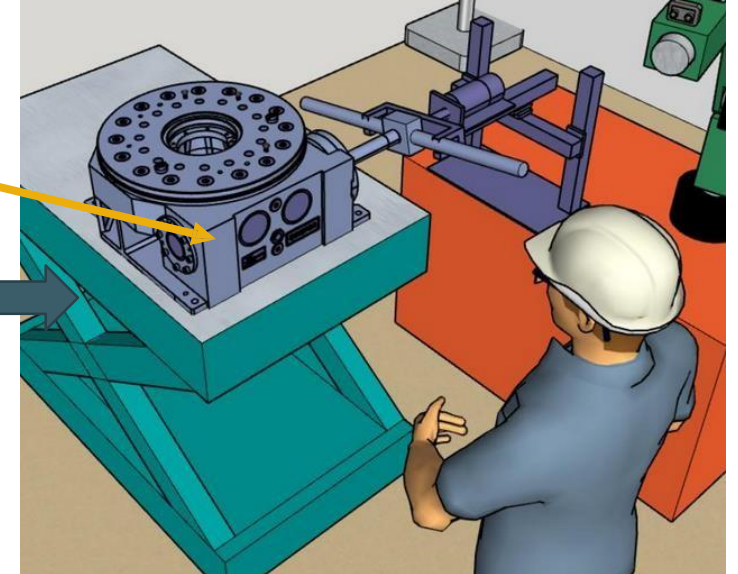
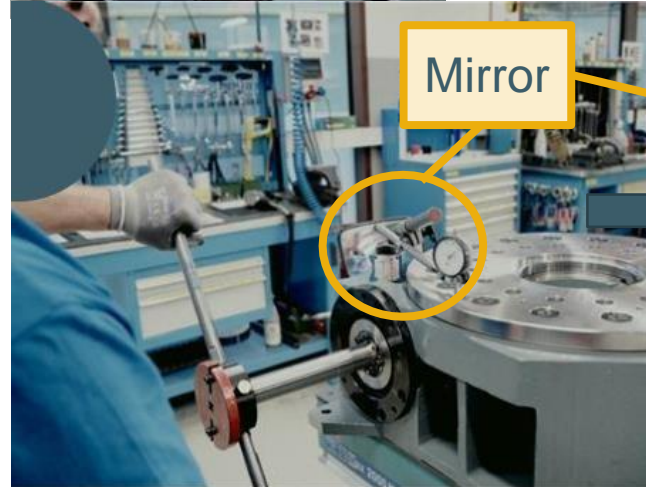
Bolt tightening

- Low added value task
- Correct torque must be applied
- Screws tightened in an specific sequence
- Several repetitions because of adjustment

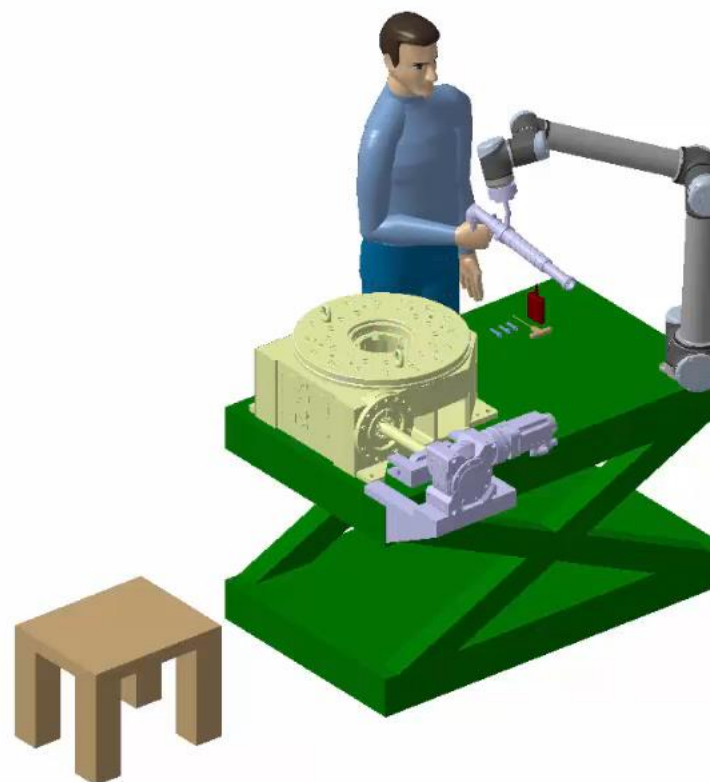


Cam followers quality inspection

- Input shaft must be rotated while observing the motion of the followers through two circular openings
- Rotation must be controlled, both torque and velocity
- Physical fatigue (20 rotations at 250Nm)
- Mirror is needed



GOIZPER use case: Servo rotatory table





CEMBRRE use case: Load/Unload pallets in CNC machines

- Parts to be machined are mounted on multi-fixturing devices (pallets)
- Screw/Unscrew = Low added value task
- Considerable number of pallet configurations -> Errors!
- Hard workload in terms of ergonomics
- Robot must assist with screw/unscrew and moving heavy parts improving operator ergonomics and reducing errors.

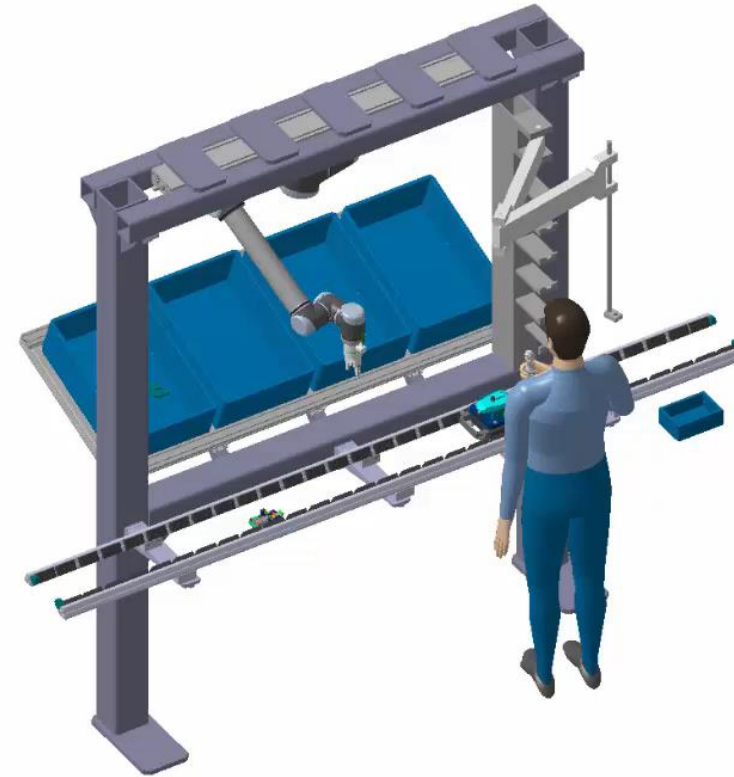
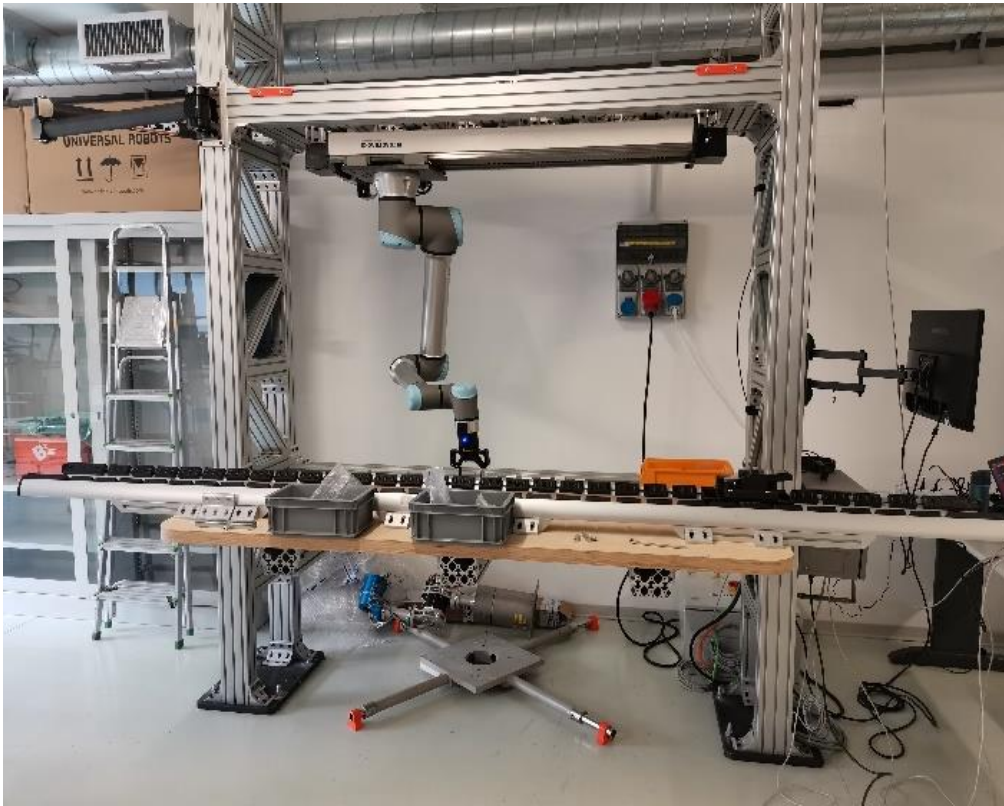


Tombstone (the metallic support)

Working Plate – where all the components are assembled



CEMBRRE use case: Load/Unload pallets in CNC machines





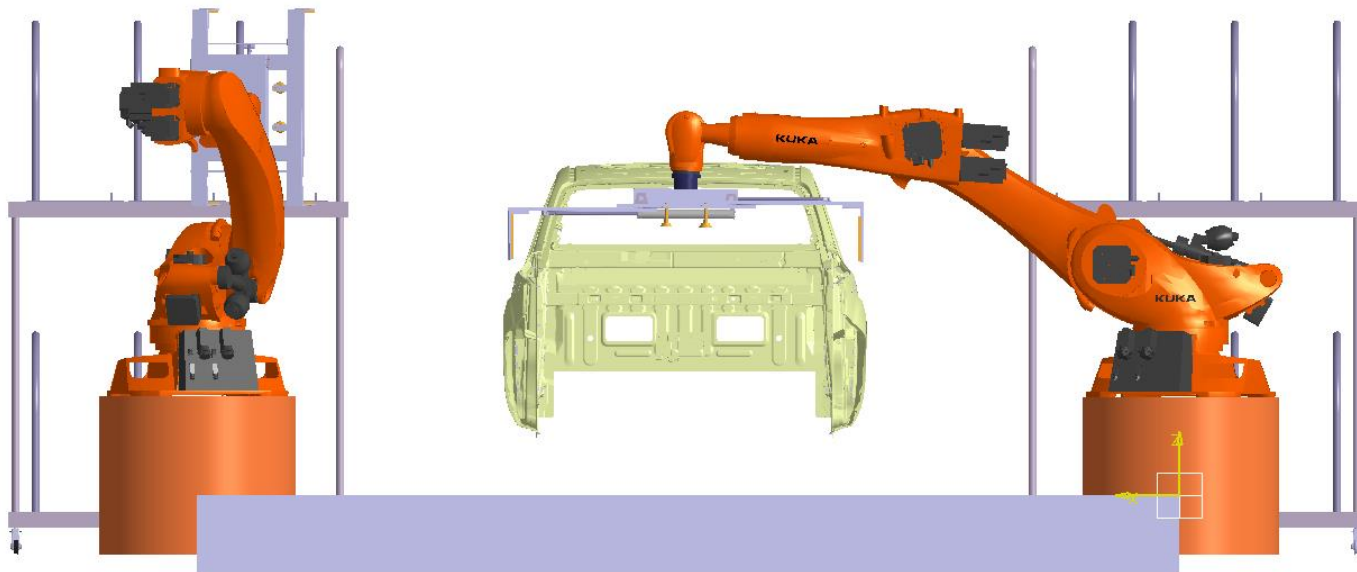
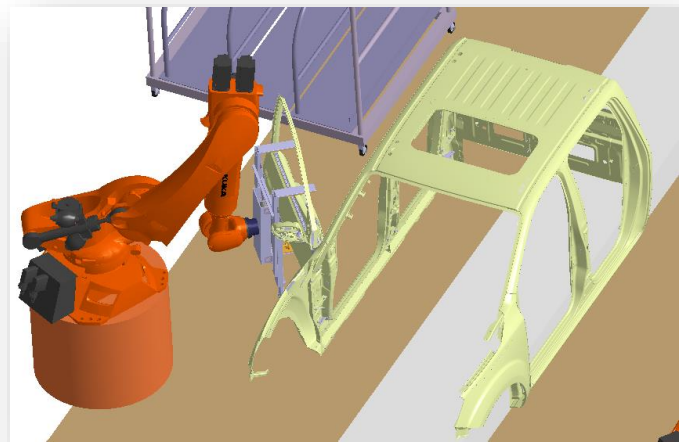
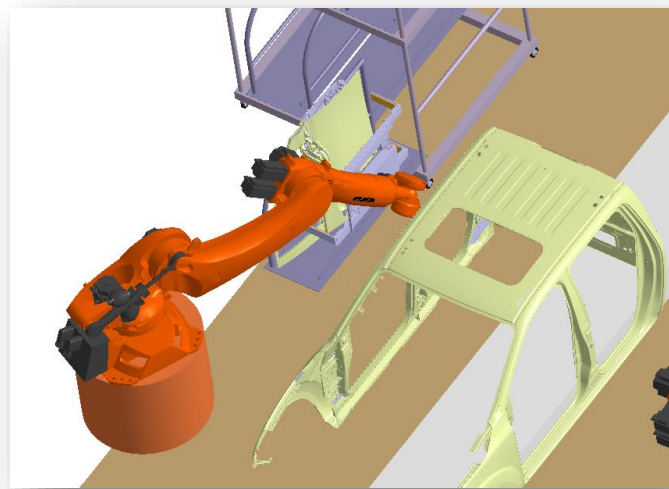
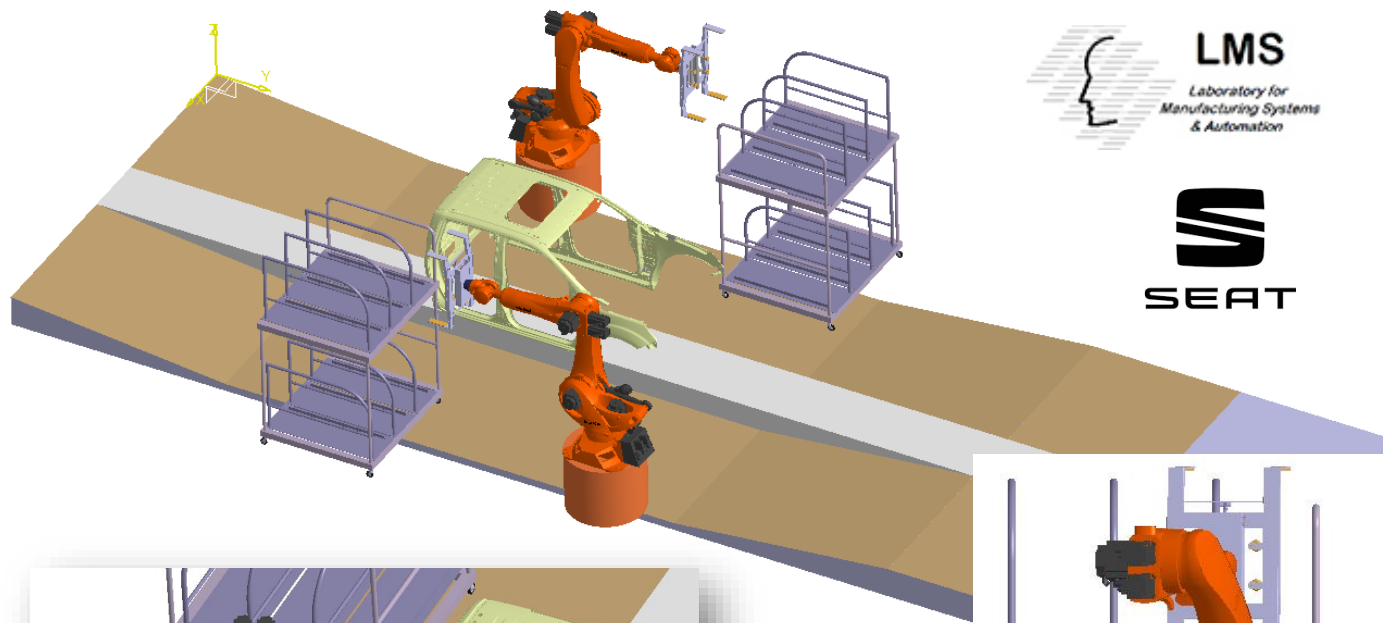
SEAT use case: Parts assembly/disassembly

- Front door, rear door, back door and hood assemblies.
- Manually lifting the parts during the assembly operations results in poor ergonomics.
- Time needed for the operator to move the parts from/to storage shelf is lost time.
- Part silhouette identification (different car models).
- Robot must follow operator's indication on how to position the door wrt. the vehicle (no need of push buttons, free hands).





SEAT use case: Parts assembly/disassembly





Thank you!



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