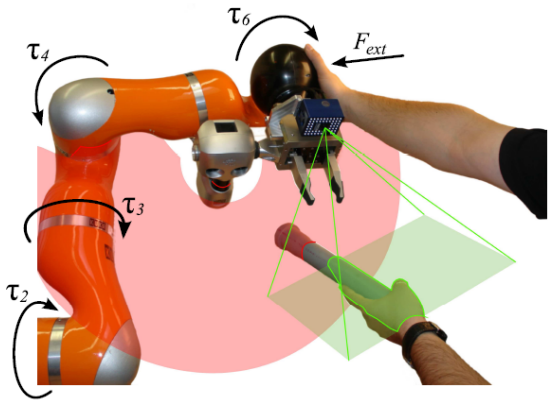
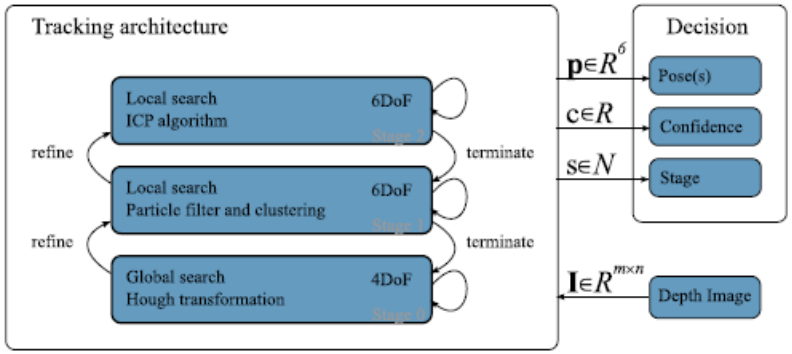
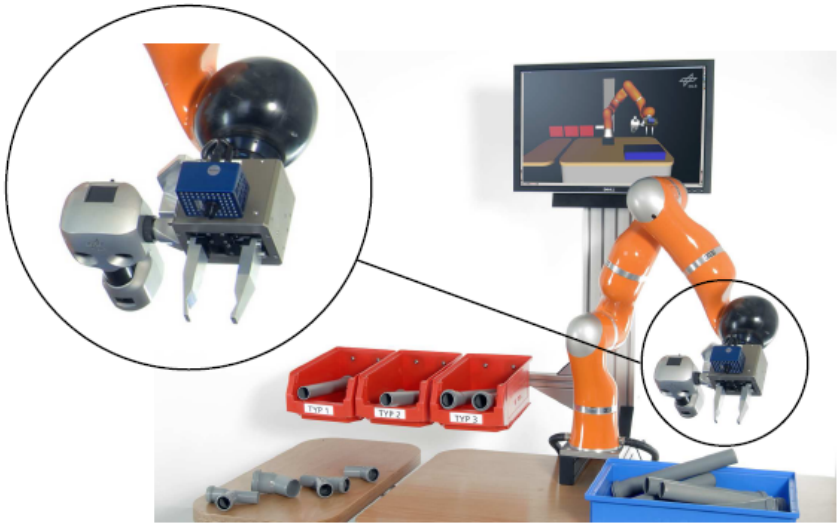
Towards the Robotic Co-Worker with the Torque-Controlled KUKA Robot - A Technology Transfer from DLR -

Towards the Robotic Co-Worker

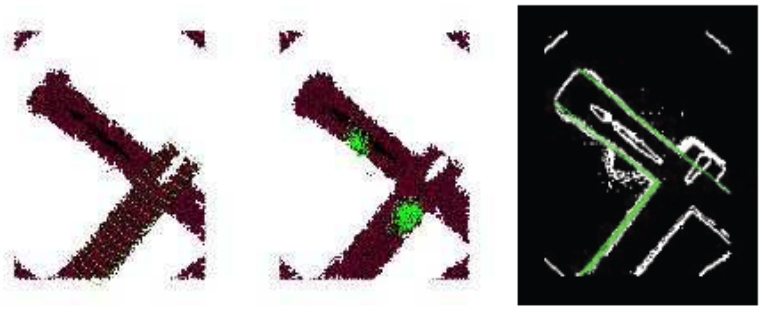
Sensing,
3D model generation
perception of humans





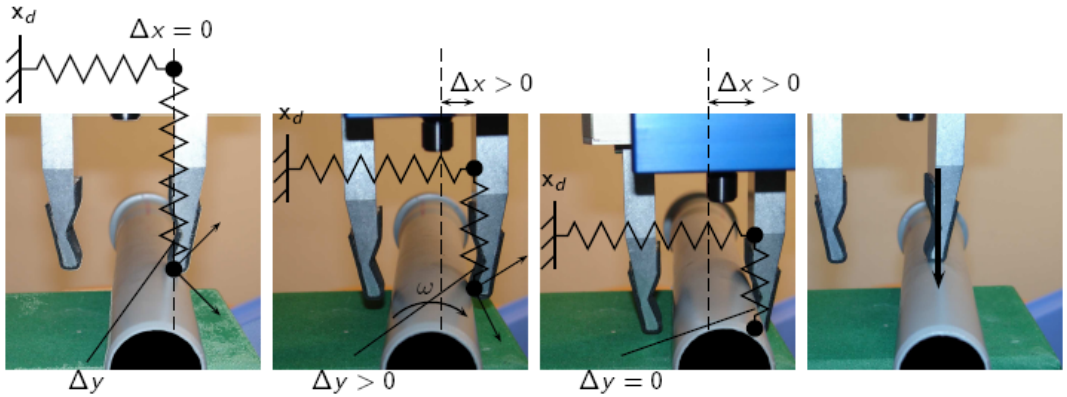


Time of Flight Camera for tracking
DLR 3D Modeler for 3D reconstruction
and workspace observation

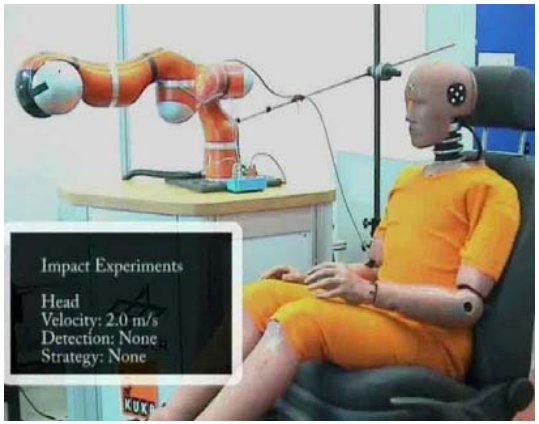


Towards the Robotic Co-Worker

- Soft Robotics Control
- Reactive trajectory generation
- Safety

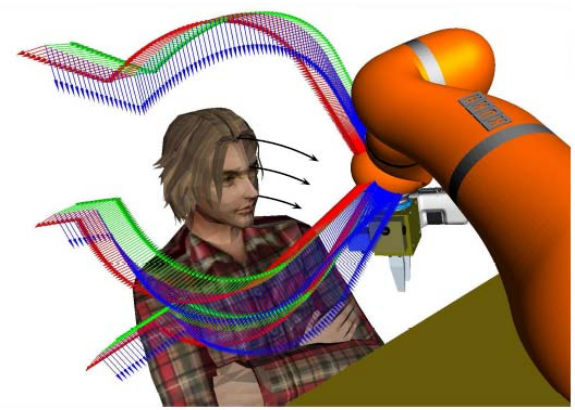


Programmable compliance for grasping



Biomechanical evaluation of injury risks

Collision detection and reaction strategies



Task relaxing reaction:
Reactive path deformation

Robust Assembly Strategy

Object localization
(Image Processing)

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Geometrical analysis of the
Region Of Attraction (ROA)

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Automatic generation of
optimal assembly trajectory

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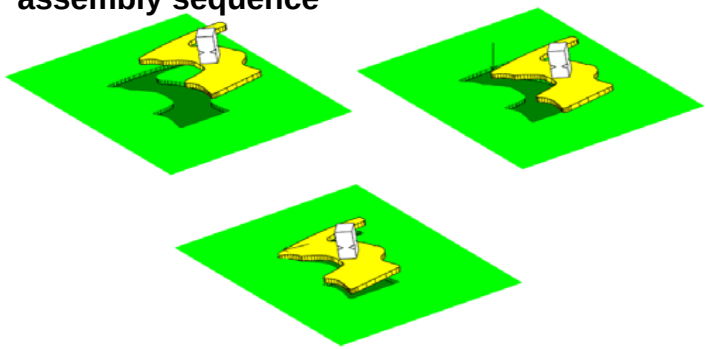
Impedance based execution
of planed trajectory

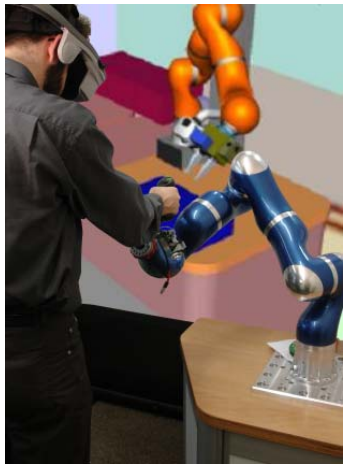
assembly sequence



Maximal robustness w.r.t. position and form errors

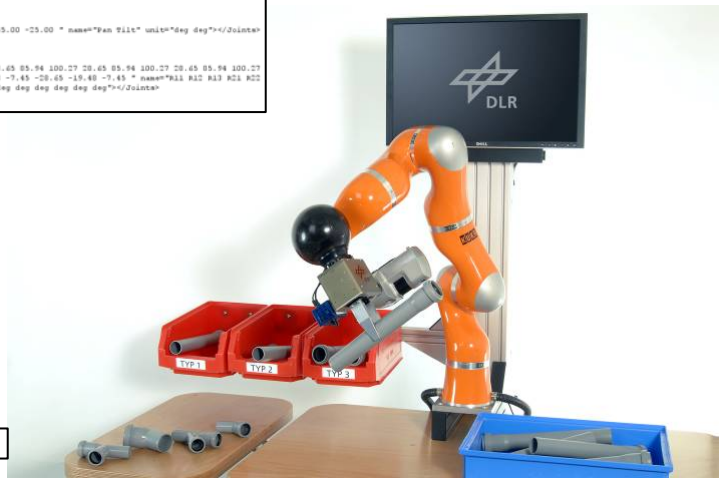
Towards the Robotic Co-Worker

Programming-by-Demonstration

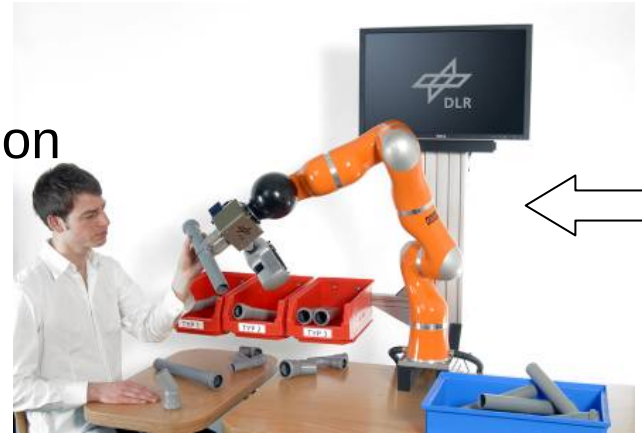


- Virtual Reality
- Tele-presence
- Direct Interaction

Robot Program



Execution



Corrective Haptic Interaction

Contact:
Alin.Albu-Schaeffer@dlr.de
Christoph.Borst@dlr.de
Carsten.Preusche@dlr.de