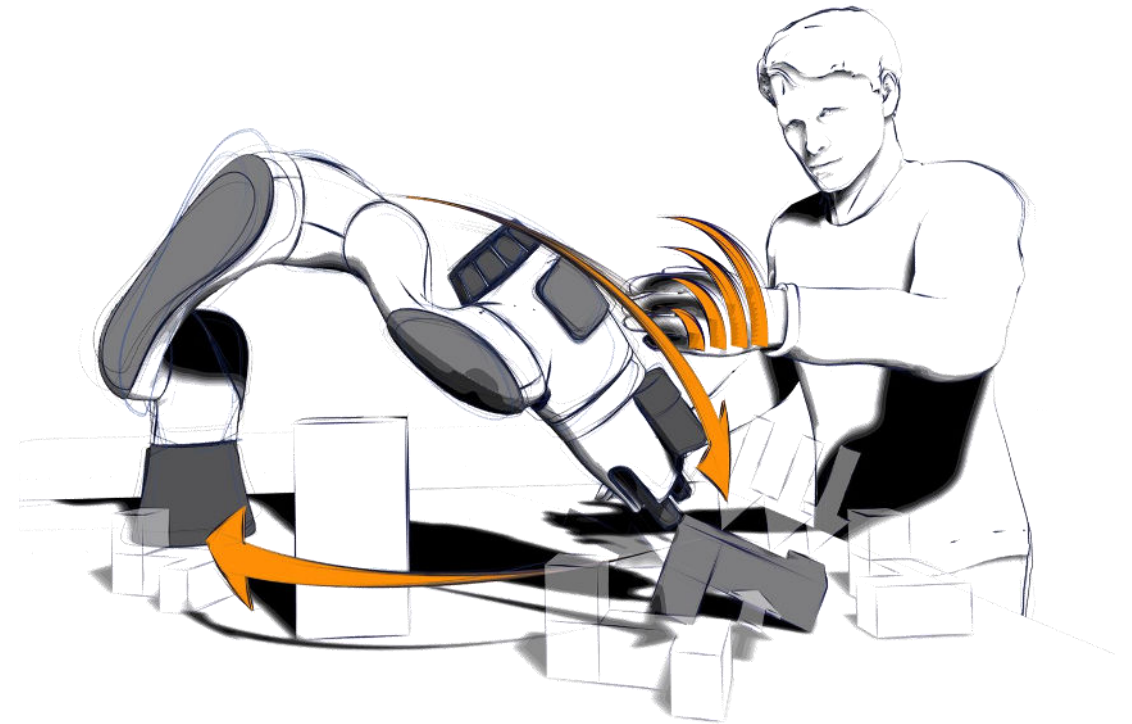


KUKA

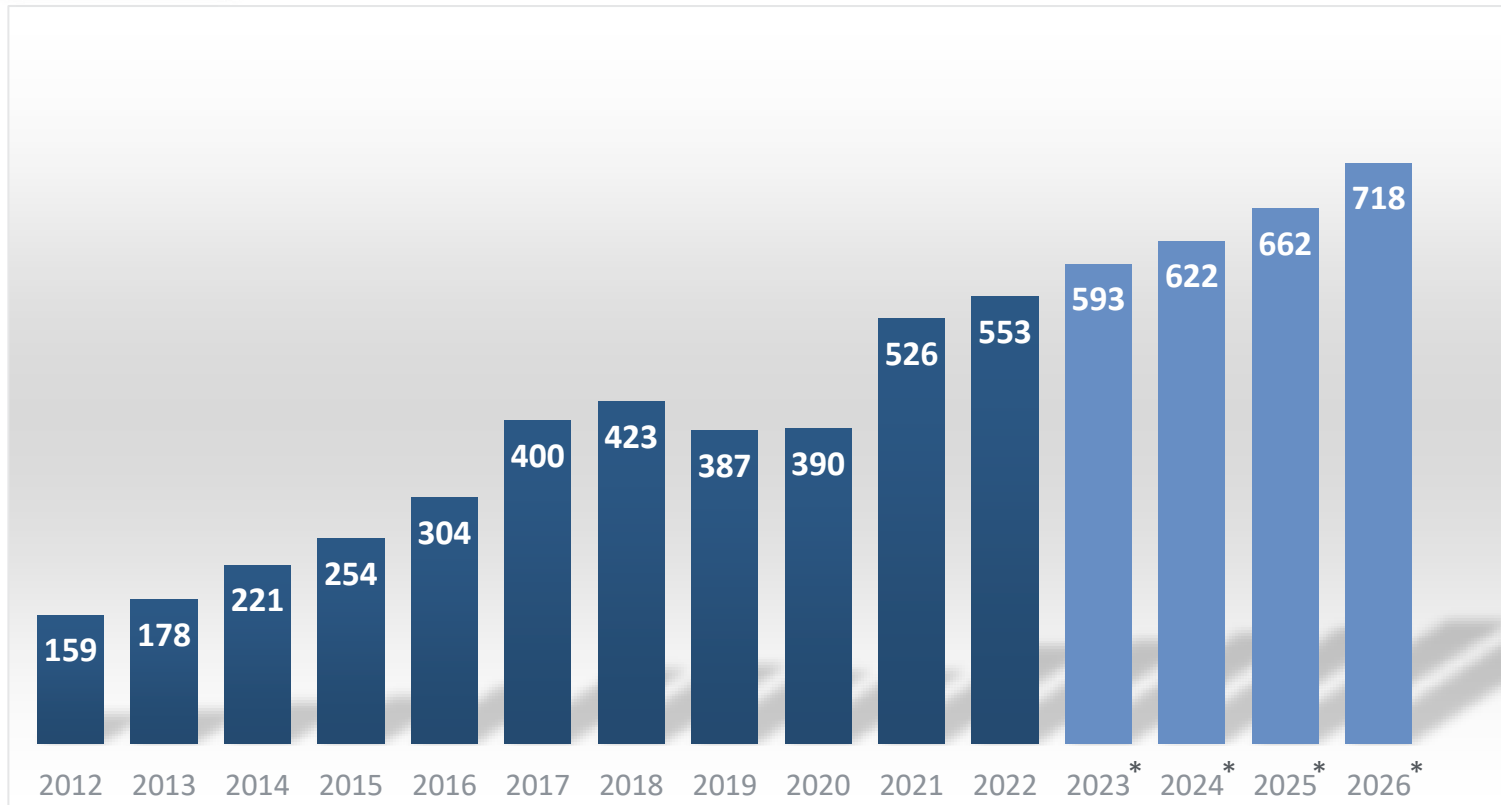
How can the EU harness the power of Industrial Automation?

Dr. Kirill Safronov, Head of Technology Research
Technology and Innovation Center, KUKA





Annual robot installations worldwide



2024 - A challenging year:
Weak growth forecasts for Germany and EU



World: 3.1 %

Source: International Monetary Fund



Euro Zone: 0.8 %

Source: European Commission



Germany: 0.2 %

Source: IFO Institute



Robot Trends 2024



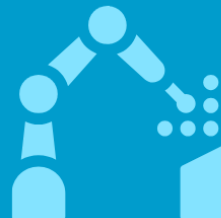
TOP 5 GLOBAL ROBOTICS TRENDS IN 2024



1
**AI AND
MACHINE
LEARNING**



2
**COBOTS IN
NEW
APPLICATIONS**



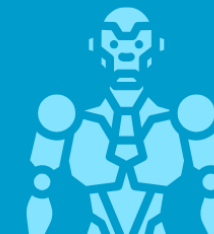
3
**MOBILE
MANIPULATORS**



4
**DIGITAL
TWIN**



5
HUMANOIDS

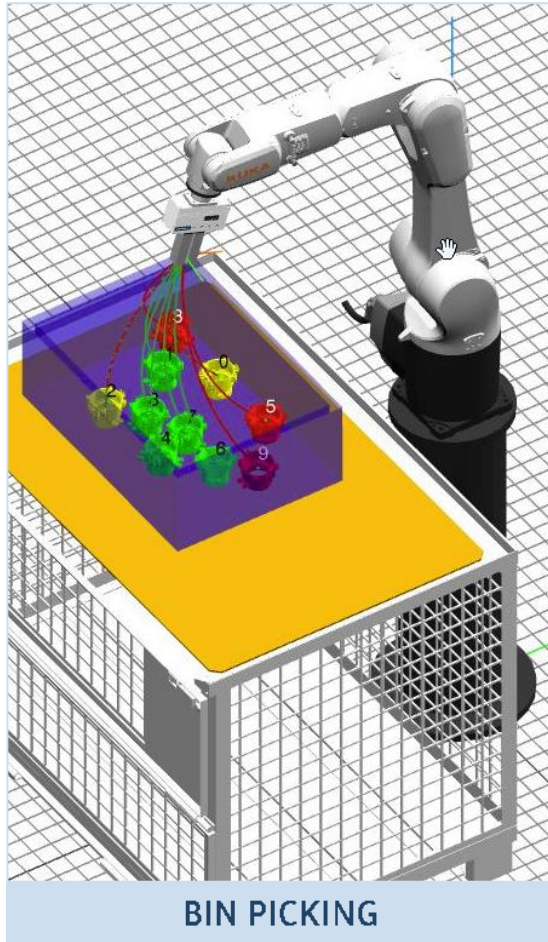


Find out more at:
<https://ifr.org/ifr-press-releases/news/top-5-robot-trends-2024>

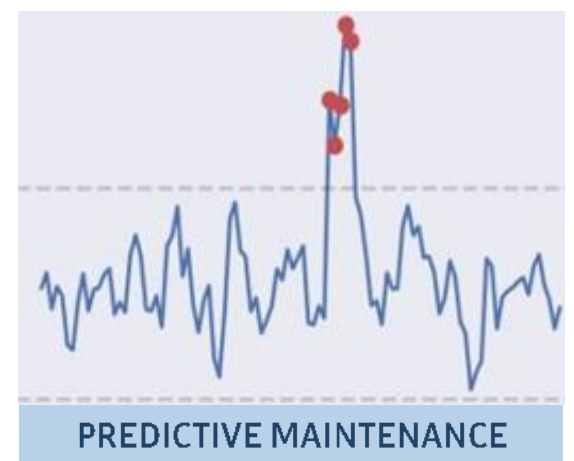
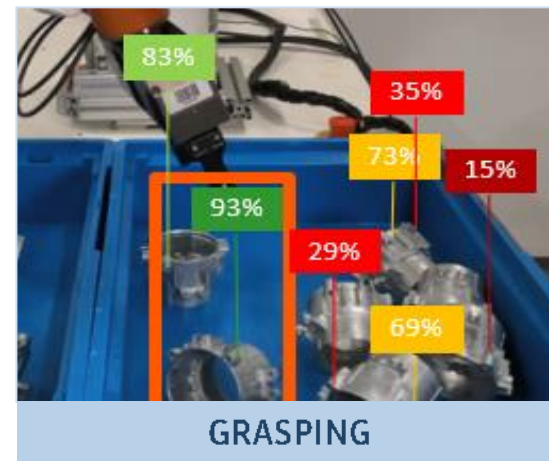
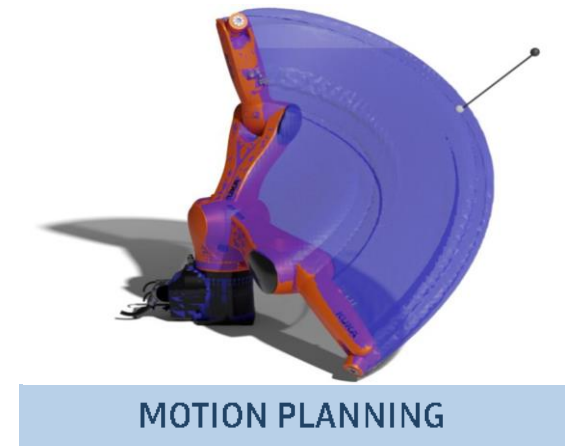
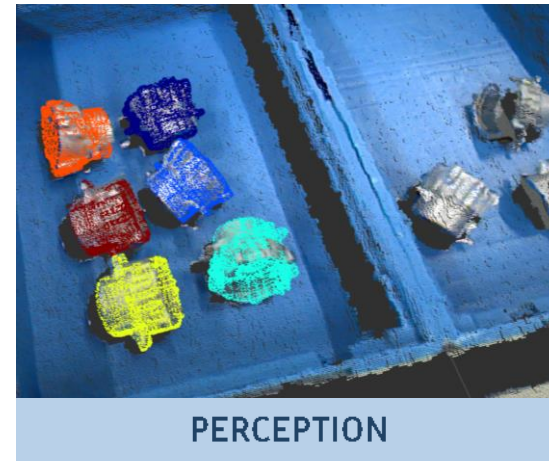
Source: International Federation of Robotics



1 - AI and Machine Learning



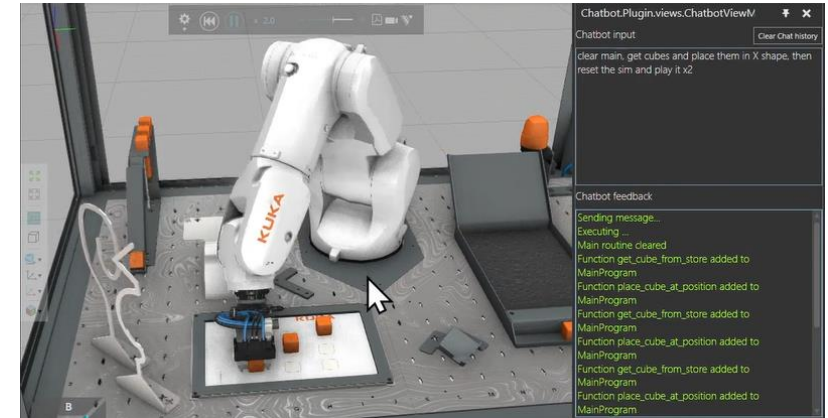
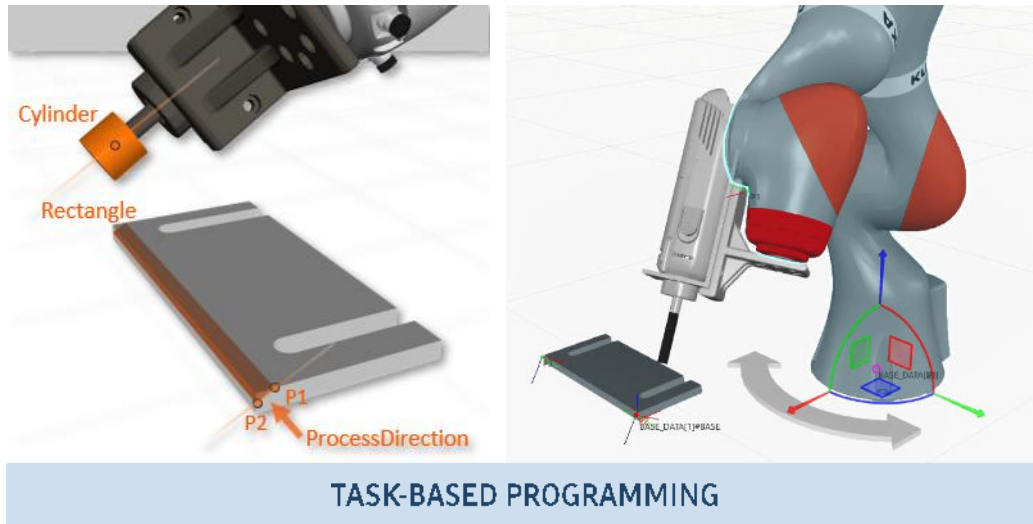
AI/ML enhanced algorithms



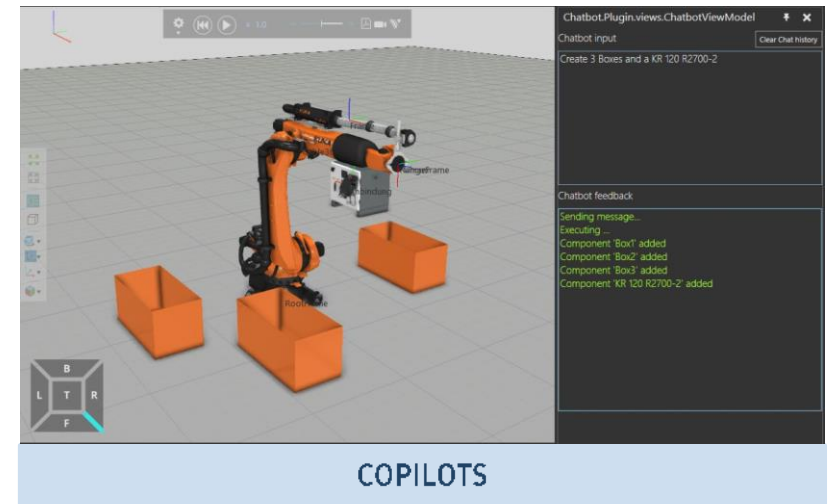


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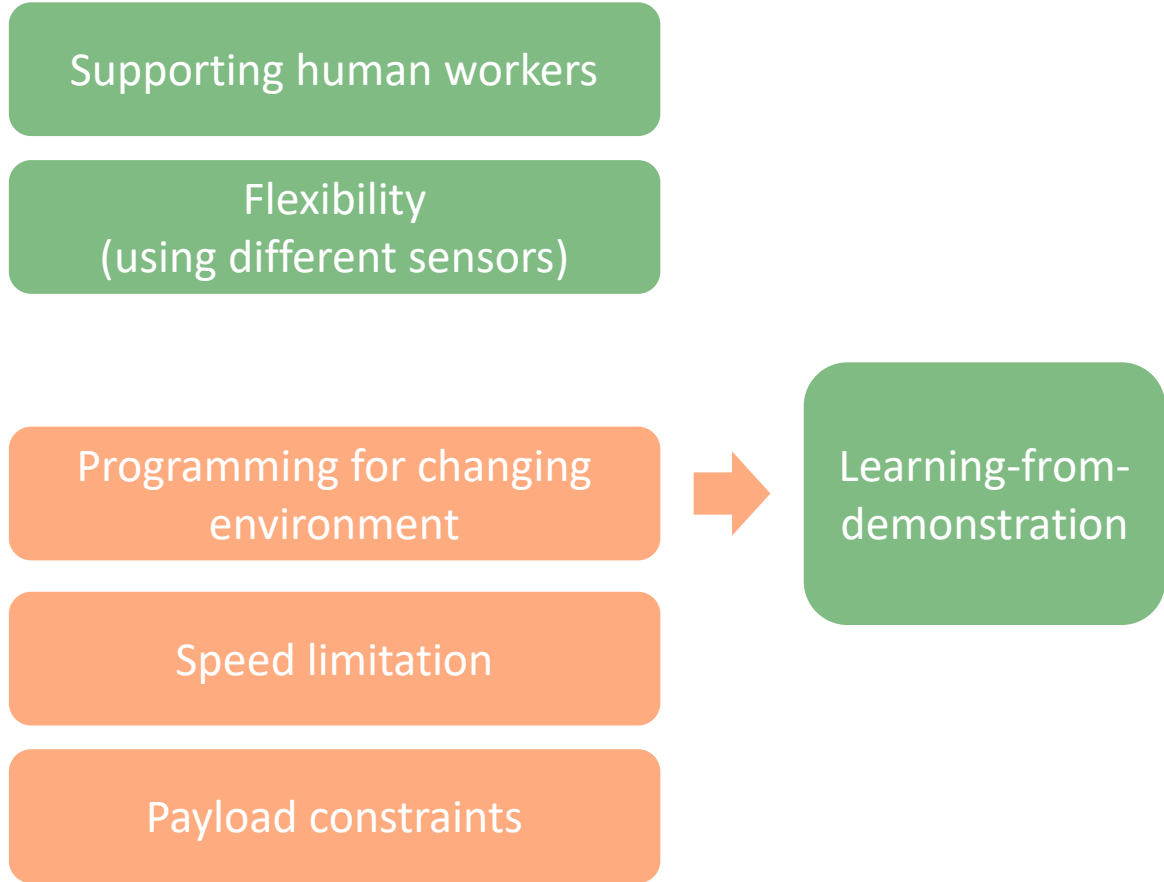
New AI/ML-based technologies enable “Easy-to-use” concept



Copilots @ Hannover Messe 2024



2 - Cobots in new applications





3 - Mobile Manipulators

Cost reduction
(less fixed workstations)

Flexibility
(using different sensors)

Supporting human workers by
accomplishing heavy tasks

Enhanced safety

Outdoor robotics





4 - Digital Twin

Fast commissioning

Easy validation in simulation

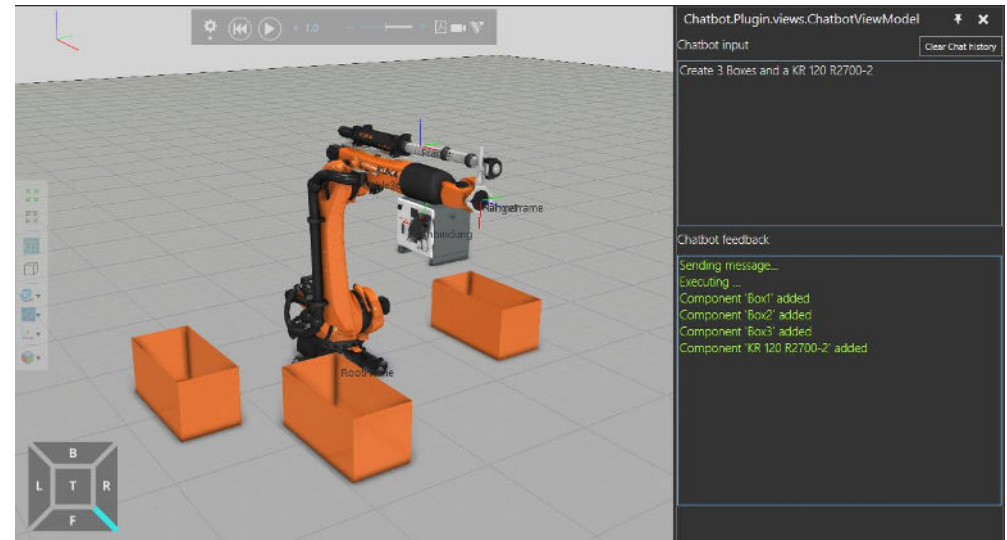
Easy-to-use
(e.g., augmented reality)

Sim2Real gap

Uncertainty quantification



Mixed reality



Simulation environment



5 - Humanoids

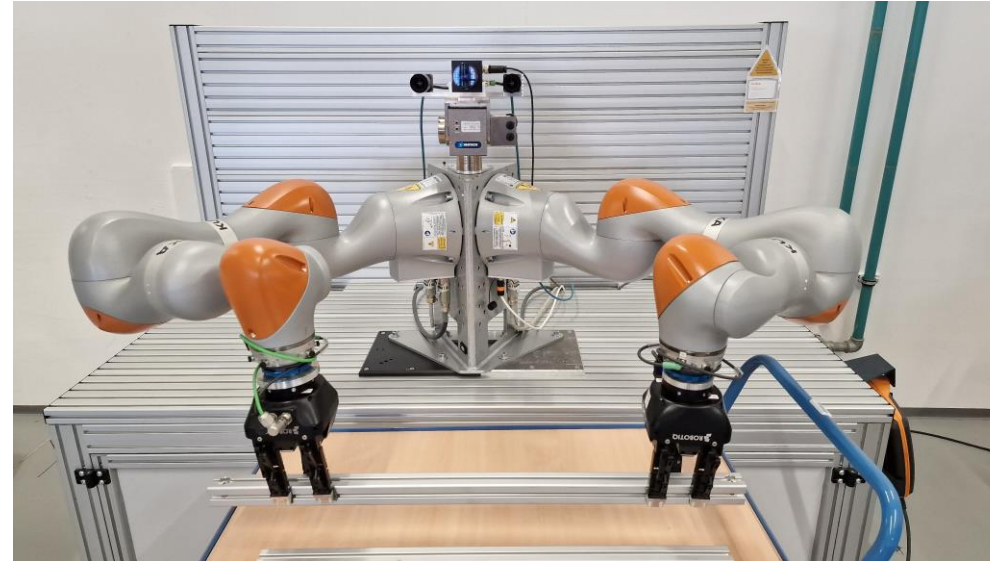
Flexibility

Cost reduction
(less workstations needed)

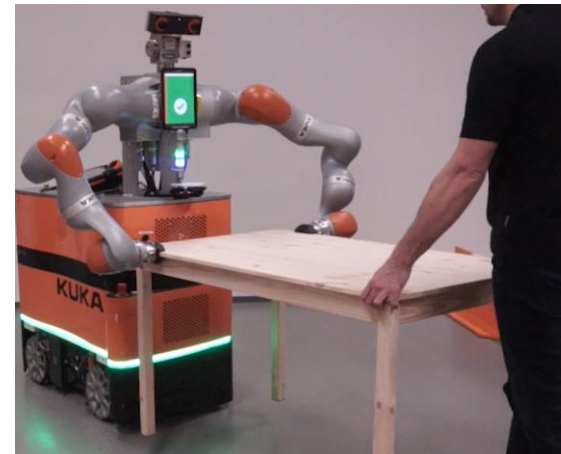
Supporting human workers

Economic feasibility

Complex programming



SMART
HANDLE



RoSylerNT

Weaknesses of AI

- Computing power
- Reliable reproducibility
- Outcome not 100% reliable
- Size of the training dataset and its quality is crucial
- Control by humans necessary



In the robotics world we can cope with these weaknesses

We have commissioning engineers:

- Can control and improve the outcome of AI functions
- Can close technical gaps

Benefit:

- AI solutions can save commissioning engineers a lot of work



Summary



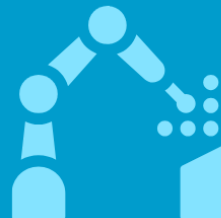
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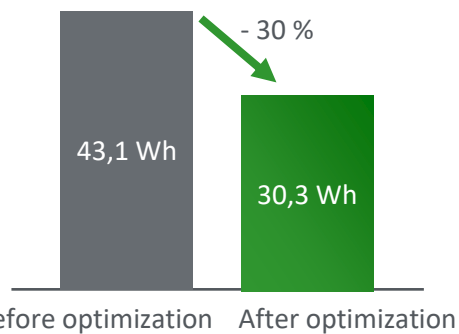
Source: International Federation of Robotics



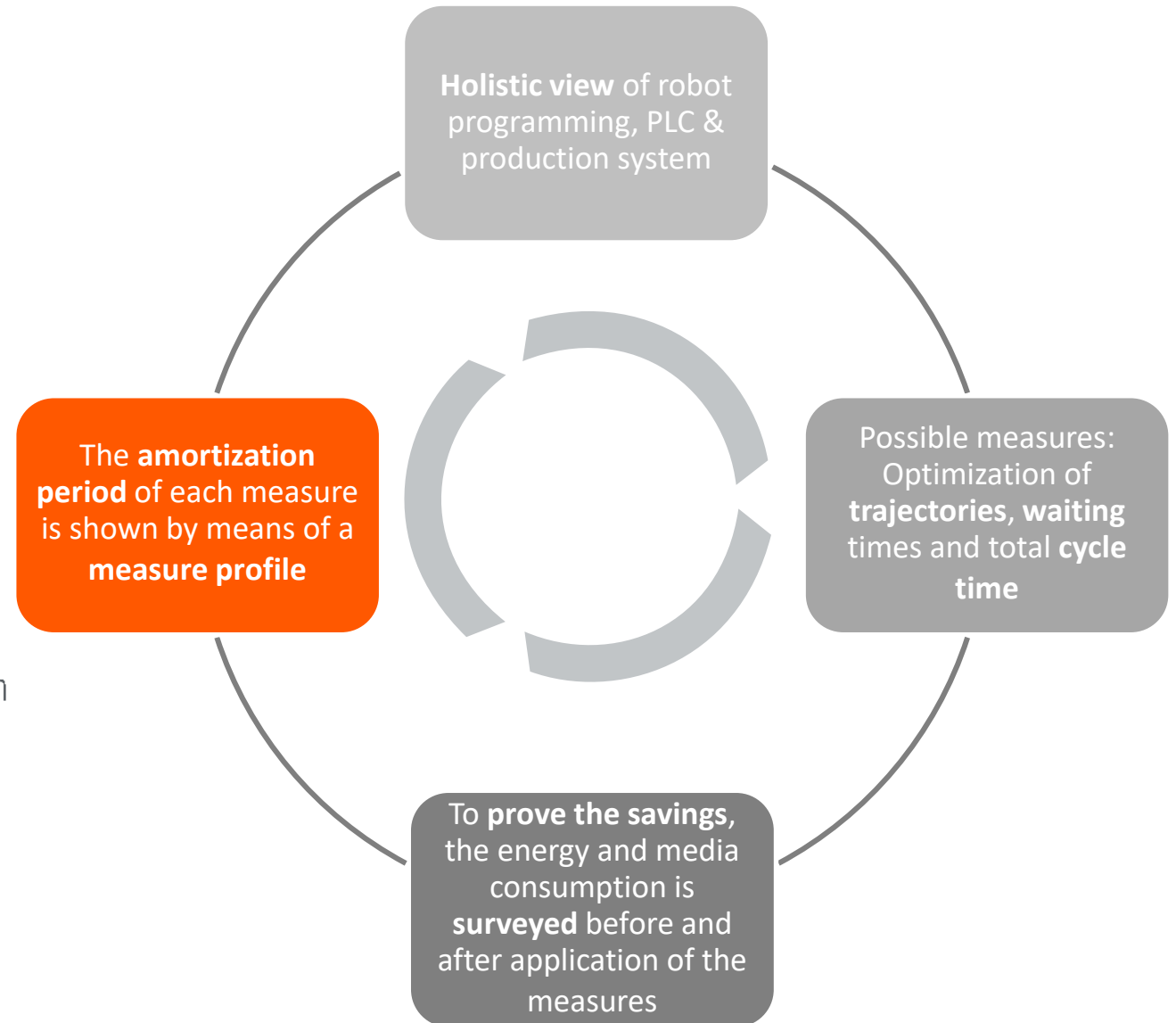
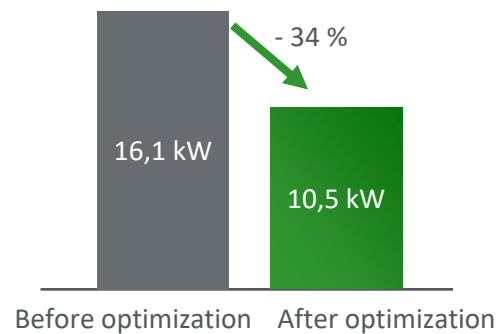
Energy efficiency



Energy savings



Peak power reduction





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