

# Cognitive Robotics in the Age of AI

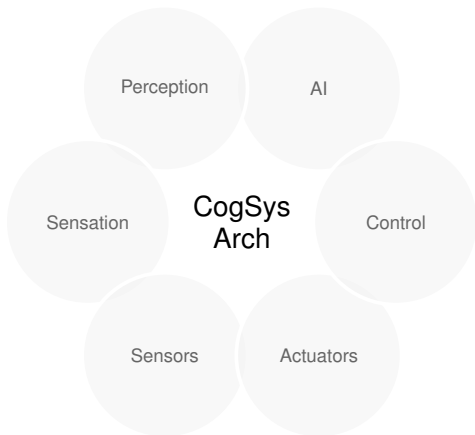
## Shaping a Sustainable Future with Intelligent Machines

Prof. Dr. Jürgen Graf

Cognitive Systems and Robotics Lab (CSRL)  
Trier University of Applied Sciences (TUAS)

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# Why this course?



## Cognitive robotics combines

- Sensing,
- Perception,
- Artificial Intelligence,
- Decision-Making,
- and Intelligent Action.

## Sustainable development relevance:

- smart mobility
- assistive systems
- resilient infrastructure

## Focus of this short course:

- real-world data
- deep learning with PyTorch
- responsible intelligent machines

## What students will do

- work with Jupyter Notebooks
- use PyTorch on real recorded data
- inspect model behaviour
- discuss strengths, limits, and failures

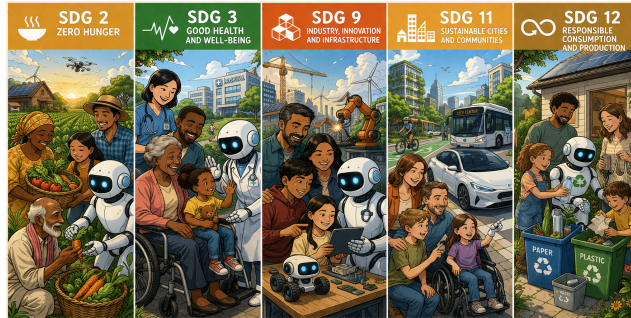
## Application domains

- autonomous driving
- humanoid robotics
- assistive intelligent systems



Image courtesy of the Cognitive Systems & Robotics Lab (CSRL),  
Trier University of Applied Sciences (TUAS).

AI for robotics should not only work!  
It should also be **robust**, **safe**, **useful**, and **societally relevant**.



Generated with ChatGPT / DALL·E, OpenAI, 2026.



## Compact structure

- Short pitch and motivation
- $3 \times 90$  min lecture block
- hands-on notebook-based work
- interactive workshop challenge

## Students will learn to

- understand deep learning in cognitive robotics
- work with real perception data
- critically evaluate model outputs
- connect robotics to sustainable impact

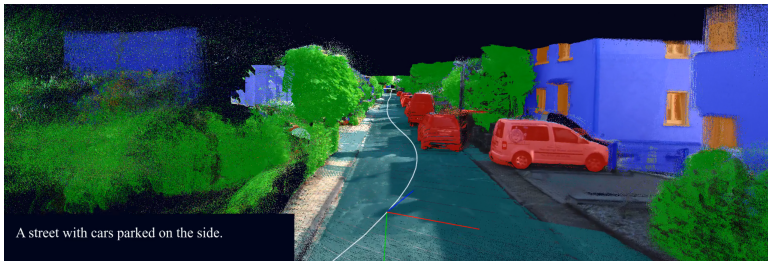


Image: KITTI dataset; instance segmentation and scene understanding by the Cognitive Systems & Robotics Lab (CSRL), Trier University of Applied Sciences (TUAS).

**Build intelligent machines —**  
*but understand their data,*  
*their limits, and their impact.*

## Short course focus:

- Cognitive Robotics
- Deep Learning with PyTorch
- Sustainable Intelligent Systems



Image courtesy of the Cognitive Systems & Robotics Lab (CSRL),  
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# Thank's for your attention!

## Questions?

