H2020 ICT 46 & ICT 47

DTU Electrical Engineering in Profile

Automation and Control Group @ DTU Electrical Engineering – Technical University of Denmark

Feedback Control

Nonlinear adaptive control
Fault-tolerant control
Bio-inspired control

System Engineering

Mechatronic design
Software development
System integration

Collaborative Autonomous Systems

Modular Design

Reconfigurable systems
Plug & Play
Modular robotics

Information Processing

Perception & sensor fusion
Machine learning & AI
Condition monitoring

H2020 ICT46 – Areas of Interest

- **RIA – Robotics Core Technology**
  - *AI & Cognition* DTU has expertise on the development of novel cognitive systems for autonomous robots based on research on at the intersection of neuroscience, computational data science and control theory
  - *Cognitive Mechatronics* DTU has expertise on mechatronic systems design, variable compliance control for safe interaction, bio-inspired control for fast adaptation and learning
  - *Socially cooperative human-robot interaction* DTU has expertise on multi-modal sensor fusion for robot navigation (indoor and outdoor), soft-robotics for safe human-machine interaction
  - *Applications areas* Healthcare → investigation of brain diseases affecting motor control
    → assistive robotics for rehabilitation
    Infrastructure IMR → heterogenous robotic systems for total maintenance (aerial, ground/surface, underwater)

H2020 ICT46 – Areas of Interest

- **IA – Robotics for agri-food and agile production**
  - DTU has expertise on medium to large scale agricultural vehicle autonomous navigation, development of models and control architectures for complex agricultural machines, integration and testing of innovative multi-sensor platforms for agricultural activities, development of AI based algorithms for perception in complex environments
  - DTU has a longstanding collaboration with AGCO for the development of intelligent autonomous agricultural machines and processes
  - *Applications areas* Agri-food

H2020 ICT47 – Areas of Interest

- **Beyond human speed, general purpose, dexterous manipulation of objects**
  - DTU has expertise on advance control methods (adaptive and nonlinear) towards increasing performance of motor control for machine tool systems
  - DTU has researched nonlinear and adaptive control methods in collaboration with Siemens
- **Development of intrinsically safe physical powerful robotic systems …**
  - DTU has expertise on fault-tolerant and reconfigurable control for safety critical systems
  - DTU has expertise on developing intelligent mechatronic systems with variable compliance control for safe interaction with human operators
- **Development of variable autonomy systems …**
  - DTU is one of leading European universities in the development of the first autonomous ship (ferry) with variable level of autonomy

H2020 ICT47 – Areas of Interest

- **Application Areas**
  - *Construction* Collaborative robotics for construction building (DTU is already involved in a proof-of-concept project in collaboration with Danish industry) → Partner
  - *Healthcare* Bio-inspired robotics for assistive robotics rehabilitation; Neurorobotics for investigation of brain diseases affecting motor control → Partner
  - *Inspection and Maintenance* Collaborative robotics for IMR of safety critical systems (DTU is leading a national project on using drones for the inspection of cargo holds) → Partner
  - *Mobility* Human and system situation awareness for autonomous mobility → Lead/Partner

Contacts

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  - Fault-tolerance, underwater robotics, surface vehicles, GNC, advance control
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  - Mobile robotics, advance control, perception, automation for agriculture


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