

Research Overview on Robotics and Automation

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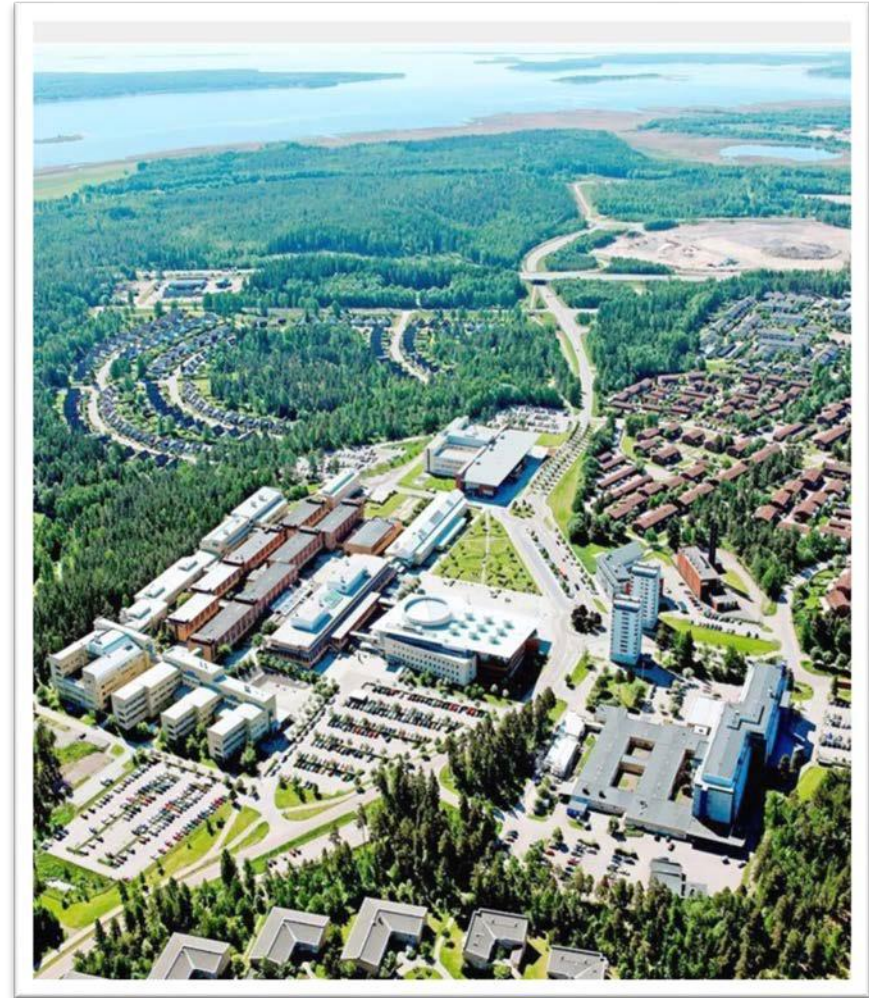
KARLSTAD UNIVERSITY
Faculty of Health, Science and Technology
Department of Engineering and Physics



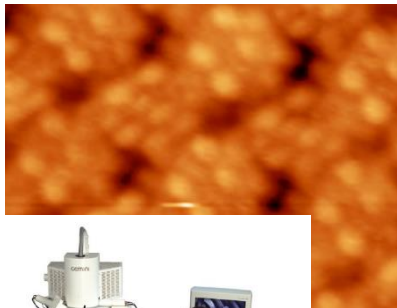
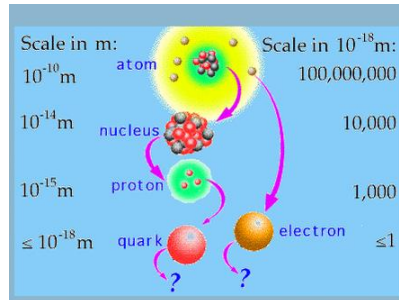


Karlstad University

- 1999, Karlstad University was granted university status – one of the youngest universities in Sweden
- 16 000 students
- 1 200 staff
- 70 programmes, of which 30 masters
- 900 courses across 50 subject areas
- 250 incoming exchange students each year.



Research Engineering and Physics



■ **Materials Physics:**

- Nanomaterials, Polymer solar cells, Carbon nanotubes, Molecular electronics,

■ **Materials Engineering:**

- Tool steel, tribology, fatigue

■ **Mechanical Engineering:**

- Solid mechanics

■ **Theoretical Physics:**

- Particle physics and Cosmology

■ **Electrical Engineering:**

- Energy Systems and Renewables, Applied Mathematical Modelling, Robotics and Automation

■ **Physics and Technology Education research:**

- Teaching and learning studies

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■ Research:

- Development of assistive robotics and devices
- Design of applied applications of biologically-inspired architectures
- Intelligent machines and automation with application to the forest, steel and solar energy industry

■ Network/Research Collaboration

- Camanio Care AB
- Glava Energy Center
- Unibap AB
- Udeholm AB
- PinWise AB
- University of Southern Denmark
- Waseda Universitet, Japan
- Tokyo Institute of Technology, Japan
- Nara Institute of Science and Technology, Japan
- Karlstads Municipality, Sweden



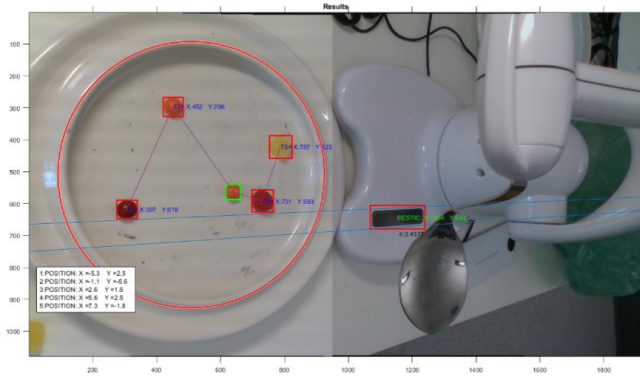
■ External Financing

- (2017-2019): Assistive robot with a multi-gripper tool and vision system for frail elderlies independent lives, JST-VINNOVA Sweden Academia-Industry International Collaboration Program on Innovative Solutions, Community Design and Services for Elderly People
- (2018-2021): Adaptive control of energy storage, ERA-Net Smart Energy System
- (2019-2020): Natural power - Have fun in meeting places out in the wild, Energimyndigheten

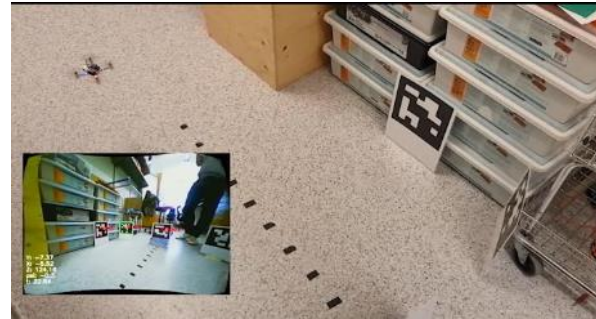


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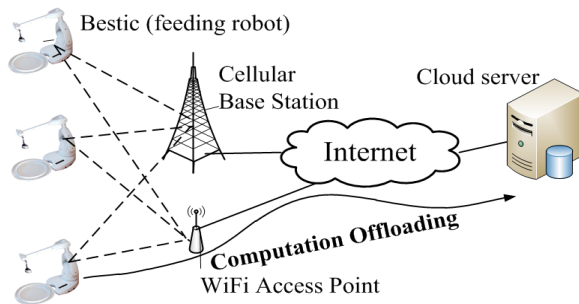
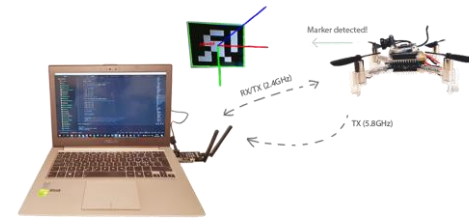
Research Topics (2011~)



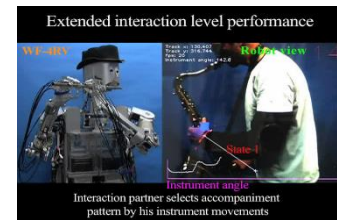
AI-based identification and vision-based arm control for picking up purposes (MX 2018)



AI-based identification and vision-based UAV navigation for monitoring purposes (ROMANSY 2020)



IoT Robot System Architecture (SmartCom 2018)



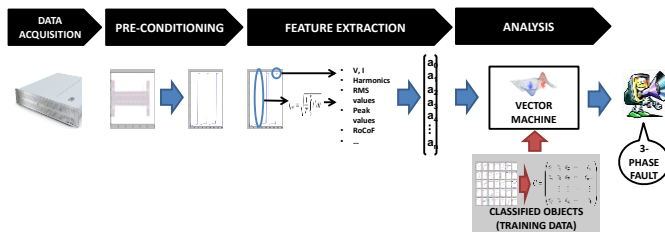
Perceptive, Cognitive and Bodily Human-Machine Interaction (AIM 2017, SI 2016, ROMANSY 2010)

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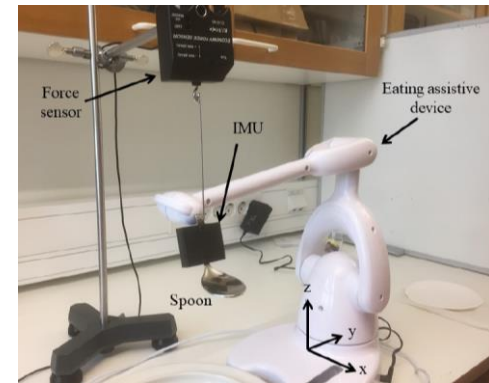
Research Topics (2011~)



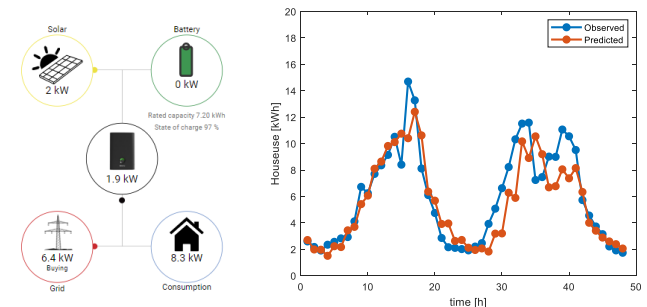
Vision-based recognition and IoT processing system (CASE 2018)



Machine-learning based pattern recognition for failure detection (EU PVSEC 2018)



Physically Interaction
Evaluation: Comfort & Effort (RO-MAN 2019, HRI 2019)



Deep learning forecasting of energy consumption for adaptive control of Energy Storage (icSmartGrid 2019)

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