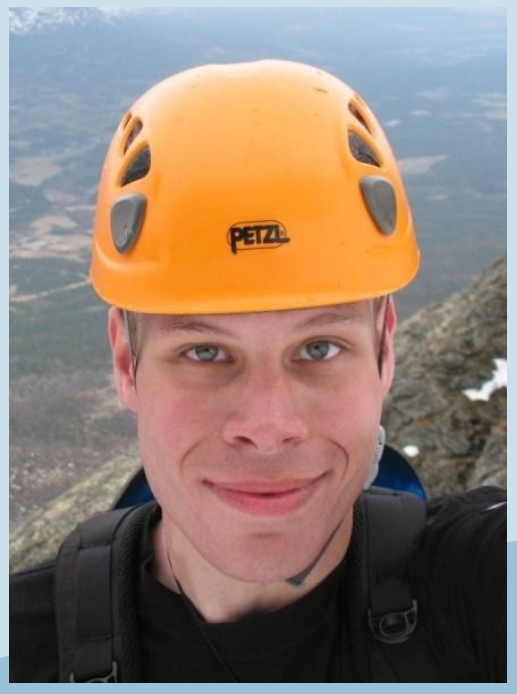
Tomasz Kosicki, PhD candidate



Tomasz Kosicki holds a Master of Science in Robotics from Warsaw University of Technology, Poland. During his studies, he was an exchange student at NTNU, and wrote his master thesis in collaboration with the robotic company PPM AS in Trondheim. The goal of the thesis was to investigate how industrial robot systems applied in Small and Medium Enterprises (SMEs) can be supported remotely by means of Human Machine Interface (HMI) based upon Cognitive Info-communication (Baranyi&Csapo, 2010).

Tomasz has started his PhD in February 2012 under the SFI Norman Programme. His academic interests include Industrial Robotics, Teleoperation, Cognitive Infocommunication, HMI, and Flexible Manufacturing Systems.

Presently, the sector of Small and Medium Enterprises (SMEs) is growing in strength. The growth is, however, still impeded by challenges specific for their size. The enterprises cannot become truly competitive for Large Enterprises (LEs), as long as their production is frequently stopped due to changeovers, and, typically for LEs, expensive feeding systems are applied. To increase the competitiveness of automatic assembly for small batch production, new methods for fast batch changeover, or reconfiguration, shall be developed. A particularly promising approach to overcome the challenges, as well as to overcome numerous other industrial challenges, is to introduce Artificial Cognitive Systems (ACS).

In traditional approach, each assembly process is designed on its own, though many of them, as well as many of the assembled components are similar, or analogical. Certainly it is highly inefficient to learn the same over and over again. It is like, when one learns how to use a hammer, and must repeat the learning process for another hammer with slightly varying size, though the purpose of each hammer is the same. Since the greatest majority of assembly components, such as screws, and processes, such as screw driving, can be standardized, a universal database containing complete description of all assembly components and processes might be build up. In turn the database can also be integrated with an automatic modular warehouse, which efficiently provides components needed for each changeover. The system can result in complete elimination of changeover breaks, and significantly shorten the time needed for implementation of new assembly processes. To benefit from such a system however, existing assembly systems shall be in certain range transformed to ACSs.

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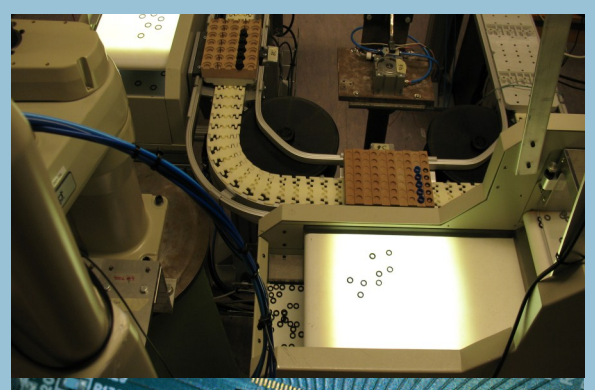
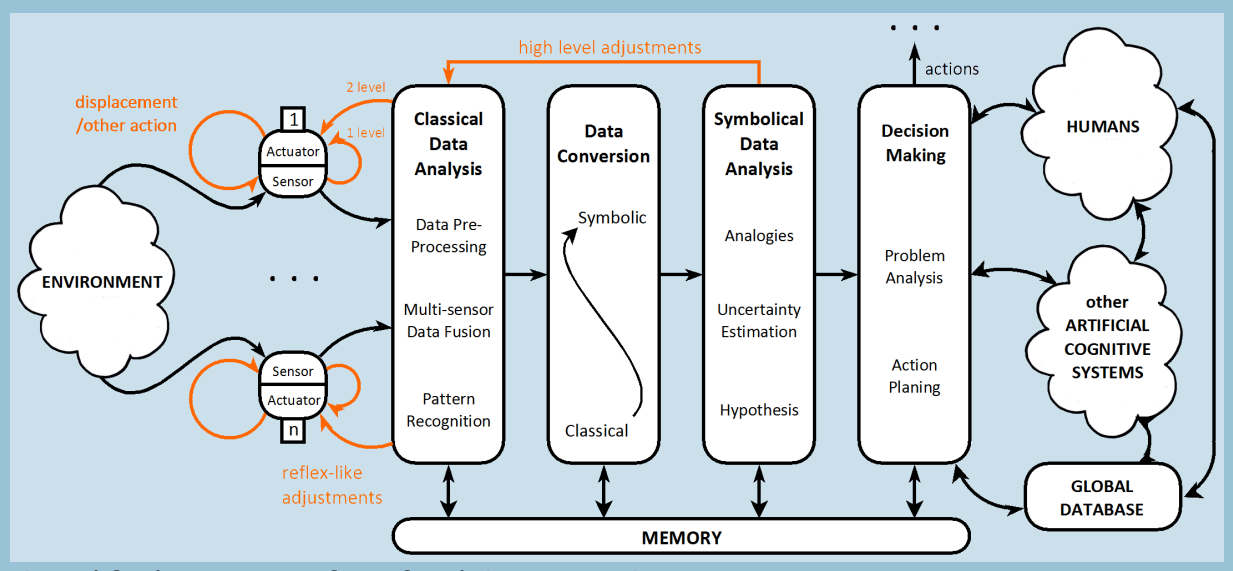
- PhD started in February 2012
- Supervisor:
  Terje K. Lien
- Co-supervisor:
  Trygve Thomessen
- Thesis title:
  Artificial Cognitive Systems in Flexible Assembly





Simplified Diagram of Artificial Cognitive System

The objectives of the thesis:

- Investigation of assembly challenges in SMEs.
- Unification of terminology and structure applied for ACS.
- Design of ACS devoted to flexible assembly in SMEs.
- Construction of a prototype assembly system aided by ACS.

SINTEF

sfi norman

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Norwegian University of Science and Technology