

## Sensor-guided robotic for the tactile Sensitive assembly

The research of the Institute of Automated Manufacturing Systems and Assembly headed by Prof. Weyrich focusses in Engineering of Automated Systems based on smart components. The three key areas of research are the composition of modular automated system, resource efficiency of production system and sensor-guided robotics which deals, among other topics, with the automated sensitive assembly of sensible parts. In this context, the collaborative research project "Batteries out of Lithium-Ion-Cells" has been launched.

"Batteries out of Li-Ion-Cells" is a project about Electromobility funded by the state of NRW, to develop a fully-automated system for the manufacturing of Li-Ion-Batteries out of large Li-Ion-Cells. The technical challenges lie, besides cycle time and process reliability, in the handling of large flexible coffee-bag-cells and also in the combined connection technology of the flexible connectors.

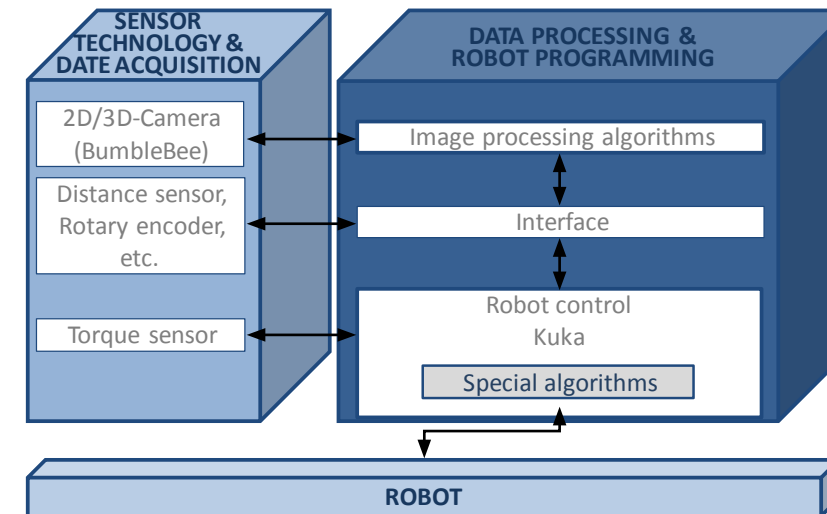
The fully-automated manufacturing system has to be variable, especially for the variant construction of the connectors and the battery-management-systems. The variability of system is enabled by a software ar-

chitecture which couples flexibly different sensortypes (e.g. cameras, force sensors, etc.) as well as specific algorithms for data processing to the robot control. These multi-sensor-systems combined with innovative algorithms allow even to automatize sensitive manual operations.

The focal points in the development and programming of the robot are:

- An intelligent Interlinking of the components by smart programming
- A system for set up of individual robot solutions of sensible components
- The development of a software respectively IT-architecture for the flexible configuration of sensor-guided robots for specific applications

In "Batteries out of Li-Ion-Cells" the sensor system consisting of 2D/3D – cameras, distance sensor and torque sensor are integrated with the Kuka Lightweight Robot and Lab View to fulfill the task. The future task is to optimize existing processes by the implementation of innovative technologies and to exploit new areas of application.



Source: Univ. Siegen  
Software-architecture for the flexible configuration of sensor-guided robots for specific applications

▼ Sensitive handling of Li-Ion-Cells



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