Johannes Schrimpf, PhD candidate

Johannes Schrimpf received his M.Sc. in engineering cybernetics from Darmstadt University of Technology and from the Norwegian University of Science and Technology as part of a double degree program in 2009. Since 2010 he has been attending a Ph.D. programme at the Norwegian University of Science and Technology at the Department of Engineering Cybernetics. His studies focus on real-time sensor-based multi-robot control in manufacturing.

”Industrial robot systems have to be more flexible than ever.”

Nowadays increasing product variations and more complex automation tasks, as handling of non-rigid materials, lead to new challenges in manufacturing. Industrial robot systems have to be more flexible than ever. To meet this demands robots have to offer a possibility to be controlled in real-time.

This work covers topics from the application control layer, the motion control layer and the interface to the position control layer.

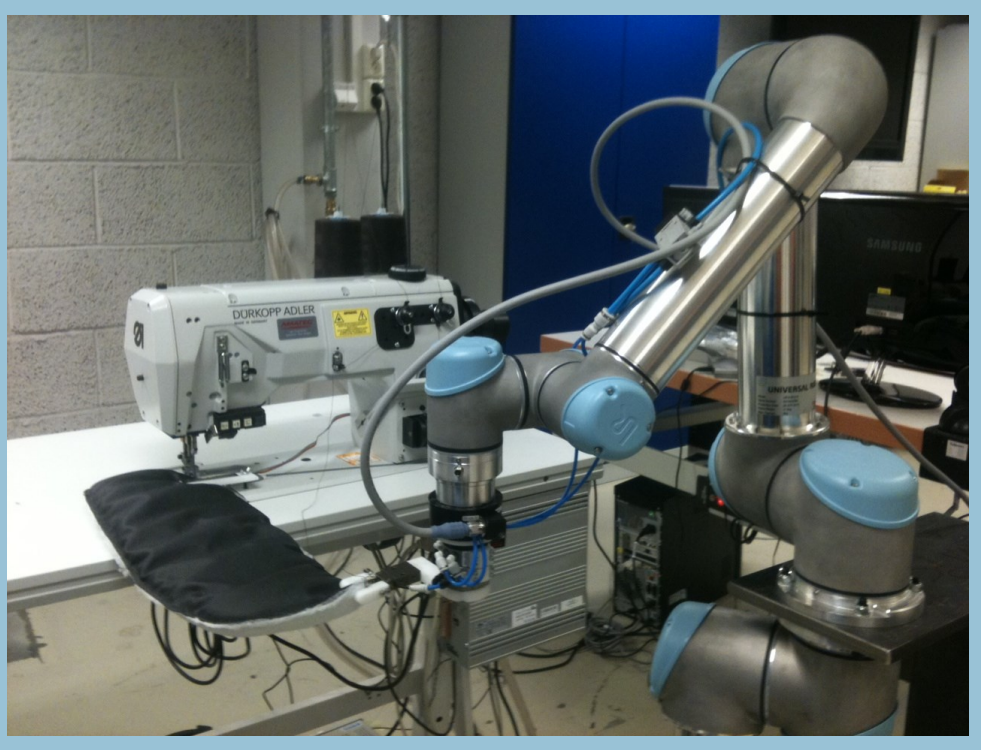
The first part of the work will focus on low-level real-time robot control strategies and the development of an own system based on a Universal Robots UR-6-85-5-A 6-axis industrial manipulator. This will be done by analyzing and adjusting parts of a real-time interface. This includes the motion control layer and parts of the position control layer.

Next, sensor-based real-time control of one industrial manipulator will be studied, utilizing a test platform. The focus will be on real-time aspects as limitations in the control loop, for example due to timing issues. It is desired to discover solutions, which are general applicable to robots, which offer a real-time interface. This corresponds to a system including the application controller for the special case of one robot.

Finally, solutions for systems with several independent elements will be looked at, especially a case including two robots which have to be synchronized to their surrounding. Here a application controller is needed which is able to handle multiple robots. As test case a sewing cell will be used, which attaches two textile parts to each other, also including cases with a resulting 3D-shaped part due to different shaped edges of the different pieces.

Facts

- Start: 01.01.2010
- Supervisor: Geir Mathisen
- Co-supervisor: Kristin Y. Pettersen, Terje K. Lien
- Thesis title: Sensor-based Real-Time Control of Industrial Robots



Test cell for furniture sewing

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