

Topic for student research / diploma / master project

Detection of Pressure Direction and Magnitude Using Matrix-Structured, Stretchable Tactile Sensors

The automation of manual tasks using robots is currently a major focus in both scientific and industrial domains worldwide. In this context, sensors play a crucial role by enabling information acquisition and processing in soft robotic systems. Matrix-structured tactile sensors are particularly promising, as they can detect both the direction of touch and estimate pressure magnitude based on the number of activated sensor nodes.

In this thesis, the existing structure and design of stretchable tactile sensors will be used as a foundation and further developed. The sensors are to be fabricated for use in industrial robotic grippers and tested in various grasping tasks. The matrix-type tactile sensor should be designed, fabricated, and evaluated through practical gripping scenarios. Furthermore, the grasping behavior with different objects shall be characterized, and the gripper integrated into an existing robotic system.



Focus of work

- Literature review on the state of the art in the field of stretchable tactile sensors
- Design and fabrication of the sensor
- Integration of the sensor into a robotic arm
- Implementation of robot control for targeted object detection and gripping
- Iterative optimization of the sensor based on experimental results
- Documentation and graphical presentation of the results

Contact person

Dipl.-Ing. Junhao Ni
junhao.ni@tu-dresden.de
N67, B102
+49 351 463-36440

Dr.-Ing. E.-F. Markus Vorrath
markus.vorrath@tu-dresden.de
N67, B210
+49 351 463-39962