Bachelor Thesis: Evaluation of a Low-Cost Tactile Sensor for Robotic Grasping

Tactile sensors have shown great advantages in robotic grasping tasks, especially verifying if an object has been grasped successfully. Vision-based tactile sensors have recently gained traction and are being investigated as a versatile and powerful alternative to more classical approaches. The idea is to measure contact forces as changes in images recorded by a camera, typically through the use of a deformable elastomer. Lambeta et al. [1] introduced a low-cost vision-based tactile sensor in a small enough form factor to be attached to the finger tips of a robotic hand. The design is open source and can be built by other research institutes. They provide attachments for popular robotic grippers and a detailed tutorial.

The aim of this thesis is to follow the instructions to build this sensor at our institute. It will include 3D printing, laser cutting, assembly of printed circuit boards and manufacturing of the gel. For evaluation, the sensor will be attached to a robotic gripper (e.g., Robotiq 2F85). This thesis can be extended to be worked on by a team of two students.

Tasks
- 3D print case and molds
- Manufacture the gel
- Assemble the PCB-board
- Assemble the sensor
- Equip a robotic gripper with the sensor
- Evaluate the sensor

Workload split
- Research and theory: 20%
- Programming and implementation: 50%
- Writing: 30%

Contact
Matthias Hirschmanner, hirschmanner@acin.tuwien.ac.at
Jean-Baptiste Weibel, weibel@acin.tuwien.ac.at
Dominik Bauer, bauer@acin.tuwien.ac.at

References

2https://robotiq.com/products/2f85-140-adaptive-robot-gripper