Compensation According to TV-L 13

Research Assistant for Capacitive Sensor Design

Autonomous robots need to sense their surroundings to act safely in the human envi-
ronment. Recently, we’ve made decisive steps developing a flexible and modular ca-
pacitive tactile proximity sensor (CTPS)\(^1\), which can be integrated into robotic hands
and even used to cover a whole robot arm. So far, we’ve demonstrated the potential
of these sensors for manipulation tasks\(^2\) and collision avoidance\(^3\).

Still, to effectively use this technology in novel applications is an open research prob-
lem. Specifically, the following topics are of immediate interest for us:

- Integration of CTPS into multi-fingered robot hands
- Control of multi-fingered hands endowed with CTPS
- Recovering of large surfaces with CTPS for safe HRI
- Hardware-design and real-time control taking safety requirements into ac-
count

Our team is looking for an excellent graduate (master or diploma) of Electrical Engi-
neering or Mechatronics. Graduates from Computer Science and Mechanical Engi-
neering are also welcome to apply if they have the corresponding experience. For this
position we expect the following profile:

- You should have experience developing analog and mixed-signal circuits. Ex-
perience using simulation tools is a plus.
- You should be proficient with PCB layout software (e.g. Altium Designer).
- You should have good knowledge of CAM/CAD software (e.g. Autodesk In-
ventor). Having experience with 3D-printing is a plus.
- You should be a proficient programmer, especially of micro-controllers. Having
experience with DSP and FPGA is a plus.

During your work you will develop technologies for enabling next-gen perception for
robots. You will be able to work independently and push novel approaches and bring
them to fruition. As part of your research you will demonstrate that your designs are
able to fulfill their purpose in concrete use-cases and collaborate with other researches
by building higher level applications together on top of your results. You will have to
opportunity to publish your results on international forums, especially robotics confer-
ences and journals. We anticipate that you intend to pursue a PhD degree in this field.

We offer the opportunity to work in a cross-disciplinary team. Teamwork, diversity, and
transparency belong to our core beliefs. Excellent English language skills are neces-
sary; German language skills are desired. In order to improve your German skills, lan-
guage courses offered at KIT can be taken.

Please send your application to Prof. Dr. Björn Hein. KIT is committed to increasing
the percentage of women in science and technology, and females are especially en-
courage to apply. Applicants with disabilities will be preferred if they are suitably qual-
ified.

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1 Alagi, H., S. Escaida, M. Mende und B. Hein: „A Versatile and Modular Capacitive Tactile Proximity Sensor“, Haptics Symposium 2016
2 Escaida, S., M. Schomert, B. Hein und H. Wörn: „6D Proximity Servoing for Preshaping and Haptic Exploration using Capacitive Tactile Proximity Sensors“, IROS 2014