

Master's Thesis (m/w/d)

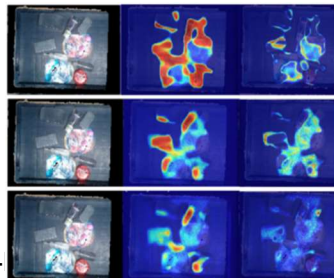
Uncertainty Estimation in Vision-based Deep Learning for robotic manipulation sceneries

Problem formulation

Uncertainty estimation plays an important role in enhancing the safety and effectiveness of critical applications like autonomous driving and robotics. In the realm of robotic manipulation, the policy governing how a robot interacts with its environment and balances the exploitation-exploration dilemma hinges on this concept. A robot may adopt a conservative approach when dealing with potentially hazardous situations, ensuring safety by avoiding risks. Conversely, when encountering novel or unfamiliar scenarios, a robot can turn to an explorative mode. This flexible change is facilitated by uncertainty estimates, which provide the robot with an understanding of unknown factors.

Task definition

Bayesian uncertainty estimation can be categorized into two sub-areas, namely the Bayesian inference and Ensemble, which involves a full variety of approaches such as variational inference, evidential learning, randomized prior functions, Laplace approximations and sampling-based methods such as Hamiltonian MC, etc. However, most of these paradigms are not tailored for the vision-involves massive state-action space, where a huge research gap exists. For these reasons, our group is now focusing on the transfer of the uncertainty estimation methods into the robot bin-picking sceneries. The main idea is a robust deep learning system that can be aware of out-of-distribution knowledge utilizing uncertainty and carry out certain calibrations on the predictions as a self-adaptive system.



You shall offer

- Solid knowledge base and experience in computer vision, deep learning and mathematics for signal processing.
- Experiences in semantic segmentation or reinforcement learning will be a plus.
- Good coding skills in Python and Linux.

We will offer

- The most state-of-the-art technologies in deep learning and computer vision.
- Powerful GPU server for training your AI.
- Nice supervisors.

Research area:
Computer Vision,
Deep Learning

Requirement:

- Experimental
- Theoretical
- Practical
- Simulation
- Construction (CAD)

Studiengang:

- Mechanical Engineering
- Mechatronics
- Electronics
- Info-Tech
- Informationswirtschaft
- Wirtschaftsingenieurwesen

Begin: From now on

If you are interested, please send us an e-mail with your **curriculum vitae** and a current **transcript of records**.

Contact person:

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Please note that your data will be treated in accordance with the applicable data protection regulations as part of the application process.