

# BACHELOR OR MASTER THESIS

## Simulation-based Rendering for Deep Learning in Logistics

Computer vision and machine learning technologies are very promising for solving complex problems in the context of logistics. However, in most cases a sufficiently large, high-quality data set is missing for the application of such methods. The focus of this work is to simulatively generate suitable training data for image-based damage detection for parcels. The quality of this synthetic data will be quantified by training machine learning methods with it and testing the resulting models on real data in order to achieve the best possible results. The best models can then help to identify damaged parcels at an early stage.

### AUFGABEN

- In-depth literature research in the field of image-based perception in logistics
- Improvement of the existing rendering pipeline, with a focus on realism and deformation of packages
- Evaluation of the quality of the generated data by evaluating machine learning models on real data
- Further own impulses and ideas when working on the project as a master thesis

### OUR OFFER

- continuous and thorough mentoring of the student
- highly motivated and fun team and constructive cooperation

### YOUR PROFILE

- high self-motivation and eager to contribute own ideas
- willingness to learn and the ability to work independently
- good programming skills in Python
- basic theoretical knowledge in Machine Learning
- experience with relevant tools (e.g. Blender) is a plus
- very good knowledge of German or English

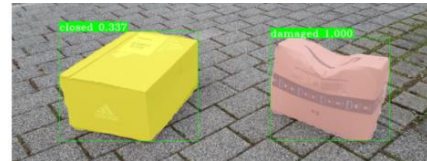
### APPLICATION

We look forward to receiving your PDF application to Alexander Naumann (anaumann@fzi.de). Please write a short, informal cover letter including the desired start date and add the following documents:

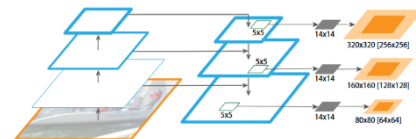
- curriculum vitae
- current transcript of records
- if applicable, further relevant certificates (internships, student jobs, etc.)

### FURTHER INFORMATION

- Start date: flexible
- Responsible Institute at KIT: Institut für Fördertechnik und Logistiksysteme (IFL) | Prof. Dr. Furmans
- Contact: Alexander Naumann (www.fzi.de/mitarbeiter/alexander-naumann)
- For related offerings, please see <https://a-nau.github.io/thesis>



Goal: Parcel segmentation and damage classification on real data.



<https://arxiv.org/pdf/1612.03144.pdf>