

About Deloitte Consulting

As a consultant company we are exposed to a wide variety of projects within the different sectors. Example of a few projects would be within semantic segmentation of drone photos, identifying fraudulent behaviours using graph networks, and many more. Internally at Deloitte we are working on improving solutions which we often come across. We are therefore looking for Master students who are interested in developing techniques for solving real world problems we have encountered. We expect the students to have prior knowledge of machine learning and statistics, and prior knowledge of ML libraries such as TensorFlow 2.x or PyTorch.

If interested in either of the following projects, please contact **Martin Closter Jespersen, Manager in Data Scientist, majespersen@deloitte.dk**

Segmenting car parts using internal dataset

Image segmentation is the process of partitioning an image into multiple segments and is typically used to locate objects and boundaries in images. This project aims to develop an image segmentation model capable of identifying and distinguishing car parts, i.e. fender, bumper, hood, front door, etc., in pictures of cars. The idea being to, in the long run, use the segmentation results in an insurance setting to allow for reporting the location (and in the longer run, the extent) of damages on cars.

There is a lot of creative freedom in coming up with a neural architecture to get the job done. Internally in Deloitte we have experimented/want to experiment with U-Net architectures, DeepLabv3+¹ pix-to-pix GAN's² and the use of pretrained embedding layers (such as ResNet 101, and newer architectures such as ResNeSt³).

The dataset supplied for the task is one developed internally at Deloitte and has been generated by means of both manual labelling and CAD software. In the case of developing a strong model fast (DICE coefficient above 0.9), we can extend to develop dataset and model to identify damages on cars, using the output of the semantic segmentation model to indicate location.

1. Liang-Chieh Chen, Yukun Zhu, George Papandreou, Florian Schroff, and Hartwig Adam, 2018. Encoder-Decoder with Atrous Separable Convolution for Semantic Image Segmentation. arXiv:1802.02611v3
2. Phillip Isola and Jun-Yan Zhu and Tinghui Zhou and Alexei A. Efros, 2016. Image-to-Image Translation with Conditional Adversarial Networks. arXiv:1611.07004
3. Hang Zhang and Chongruo Wu and Zhongyue Zhang and Yi Zhu and Zhi Zhang and Haibin Lin and Yue Sun and Tong He and Jonas Mueller and R. Manmatha and Mu Li and Alexander Smola, 2020. ResNeSt: Split-Attention Networks. arXiv:2004.08955.