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Evaluation of the Master thesis of Mr. Till Schöpe

„Development and Evaluation of a Concept for the Augmentation of Data to Train Neural Networks for the Semantic Segmentation of LiDAR-Pointclouds"

In the master thesis of Mr. Till Schöpe two types of methods for the augmentation of LiDAR point clouds are developed, applied and evaluated. The methods are aimed at automating the time-consuming process of manually generating labelled data. The first method type contains the generation of so-called semi-artificial data. Selected objects are recorded in a controlled environment, extracted, stored in a database and later used in other recorded environments of the target domain as specified by the user. The second method type transforms existing labelled data in a way that is suitable for duplicating the data. The focus of this thesis is on the generation of data that enable the training of neural networks for the recognition of so-called "Vulnerable Road Users" (VRUs) by semantic segmentation of point clouds. These networks are used in automated vehicles.
The results of Mr. Schöpe's work show that the developed methods are suitable for the automatic generation of labelled data. The validation metrics selected are the intersection over union (IoU), the hit rate and the accuracy of a neural network trained with the generated data and applied to validation data. With the use of semi-artificial data, an IoU of 31.7% is achieved, which is comparable to results from literature where labels were generated manually. It could also be shown that the hit rate can be further increased by using the augmentation methods developed for the transformation and duplication of data.
A publication of the methodology is intended, but will be evaluated on data collected with another (better) sensor system. This delay is a small weakness of the work presented. In addition, I would have liked the theoretical background to the work to have been worked out in more detail.
The elaboration of the results is very well structured and clearly presents the important findings.
The structure of his presentation was also well structured, understandable and very well presented.
Summarized I rate Mr. Schöpe's master thesis with the grade 1,3.

(Univ.-Professor Dr. Rainer Waser)