SUPERVISOR'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	Development and Evaluation of a Concept for the Augmentation of Data to Train NeuronalNetworks for Semantic Segmentation of LiDAR-Pointclouds.
Author's name:	Till Schöpe
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis supervisor:	Ing. Martin Hlinovský, Ph.D.
Supervisor's department:	Czech Technical University in Prague, Department of Control Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

Evaluation of thesis difficulty of assignment.

An accurate environment perception is a key requirement for automated vehicles. To help fulfill this requirement, a promising approach is the semantic segmentation of LiDAR-pointclouds using neural networks. The acquisition of large amounts of annotated data needed for training these networks is challenging due to the high cost of manually labeling pointclouds.

Satisfaction of assignment **fulfilled**

Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.

In this work, data augmentation is proposed to obtain a high number of annotated LiDAR-pointclouds without the need of manual labeling. Two augmentation strategies are presented, the first one being the creation of semi-artificial samples and the second one the application of label-preserving transformations. Semi-artificial samples are created by automatically extracting objects from a controlled environment and inserting them into scenes where these objects do not occur.

Activity and independence when creating final thesis **A - excellent.**

Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.

Till worked with a lot a motivation and perseverance during the complete working time of his master thesis. He was able to work very independently and required minimal assistance from the supervisors.

Technical level **A - excellent.**

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

Formal and language level, scope of thesis **A - excellent.**

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

The student produced a scientifically accurate and well written thesis. It documents all relevant work and results, and clearly shows the engineering relevance and excellence of his work.

Selection of sources, citation correctness **A - excellent.**

Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished

from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.
Student has displayed ability to work with international scientific publications as well as industrial level publications and information.

Additional commentary and evaluation
Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.
Please insert your commentary (voluntary evaluation).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation.

I evaluate handed thesis with classification grade **A - excellent.**

Date: **14.6.2019** Signature: Ing. Martin Hlinovsky, Ph.D.