



Supervisor's statement of a final thesis

Student: Pavel Jahoda
Supervisor: Ing. Jan Čech, Ph.D.
Thesis title: Car chasing simulation in Carla
Branch of the study: Knowledge Engineering

Date: 10. 6. 2020

<i>Evaluation criterion:</i>	<i>The evaluation scale: 1 to 4.</i>
1. Fulfilment of the assignment	<u>1 = assignment fulfilled,</u> 2 = assignment fulfilled with minor objections, 3 = assignment fulfilled with major objections, 4 = assignment not fulfilled
<i>Criteria description:</i> Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.	
<i>Comments:</i> The assignment was fulfilled fully. Moreover, the optional point, on implementing the proposed algorithm on the real autonomously driven sub-scale vehicle, was done as well.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
2. Main written part	100 (A)
<i>Criteria description:</i> Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies? Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 26/2017, Art. 3. Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.	
<i>Comments:</i> Written part of the thesis presents all important points in sufficient details.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
3. Non-written part, attachments	100 (A)
<i>Criteria description:</i> Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.	
<i>Comments:</i> Besides the text of the thesis, all extra material is systematically presented in Pavel's GitHub. The side contains codes, trained models, available datasets and recordings of the experiments.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
4. Evaluation of results, publication outputs and awards	100 (A)
<i>Criteria description:</i> Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.	

Comments:

The thesis is a good research report. The problem, "autonomous car chasing", does not seem to be studied in literature intensively. There are novel contributions of the thesis: (1) Collected Carla Car-Chasing dataset + definition of error statistics (any researcher can download the dataset and compare), (2) Baseline algorithm for autonomous chasing + quantitative evaluation on the Carla dataset. (3) Proposal, implementation, and evaluation of a novel dual-task network that simultaneously perform object detection and a coarse semantic segmentation. (4) The algorithm tested on a real autonomously driven sub-scale vehicle (with qualitative results at the moment).

We believe the contribution has enough novelty, so we are preparing a conference paper. Pavel is currently intensively working on improving the method and quantitative evaluation of the real drive experiments.

Evaluation criterion:

The evaluation scale: 1 to 5.

5. Activity and self-reliance of the student

5a:
1 = excellent activity,
2 = very good activity,
3 = average activity,
4 = weaker, but still sufficient activity,
5 = insufficient activity
5b:
1 = excellent self-reliance,
2 = very good self-reliance,
3 = average self-reliance,
4 = weaker, but still sufficient self-reliance,
5 = insufficient self-reliance.

Criteria description:

From your experience with the course of the work on the thesis and its outcome, review the student's activity while working on the thesis, his/her punctuality when meeting the deadlines and whether he/she consulted you as he/she went along and also, whether he/she was well prepared for these consultations (5a). Assess the student's ability to develop independent creative work (5b).

Comments:

Pavel was very keen on the problem. He was not happy with the simulations only, he made a great effort to make the proposed algorithm working on a real sub-scale vehicle. Pavel was very active in identifying limitations of the method under development and proposed new solutions. We were meeting regularly, usually weekly, and Pavel was always well prepared and the progress was very fast. For instance, Pavel managed to implement the dual-task network on top of popular YOLOv3 detector extremely swiftly.

In general, Pavel is enthusiastic in research and in learning new stuff in general. Pavel is a skillful programmer; he already acquired a solid competence in deep learning. Besides his indisputable talent in research, he is very active, working hard and does not hesitate to invest a large portion of his free time to do the work. He is able to perform many experiments autonomously to a large extent, and presents results very quickly. Pavel is not just a typical practitioner, but he is very much interested in theoretical aspects of the problem and he always asks meaningful questions, reads papers and follows related research.

Evaluation criterion:

The evaluation scale: 0 to 100 points (grade A to F).

6. The overall evaluation

100 (A)

Criteria description:

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.

Comments:

The problem is certainly not trivial. We have to consider that the methodology is complex, including algorithms, computer vision, deep learning, control engineering, and all necessary engineering skills to make it working. Moreover, moving from simulations to a real sub-scale vehicle is a highly technically demanding process, which Pavel managed very well. I believe that the level of Pavel's Bachelor thesis is comparable to a good quality Master's thesis in many respects (non-triviality, novelty, complexity of the methodology, results, etc.)

In summary, I do recommend the thesis for the defense and I suggest assessing the thesis by A -- Excellent.

Signature of the supervisor: