

## I. IDENTIFICATION DATA

<b>Thesis name:</b>	<b>Detecting objects in images with known scene geometry</b>
<b>Author's name:</b>	<b>Bc. Matěj Suchánek</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Computer Science
<b>Thesis reviewer:</b>	Ing. Marek Hruží, Ph.D.
<b>Reviewer's department:</b>	Dep. of Cybernetics, Fac. of Applied Sciences, University of West Bohemia

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>challenging</b>
<i>Evaluation of thesis difficulty of assignment.</i>	
Please insert your commentary.	

<b>Satisfaction of assignment</b>	<b>fulfilled</b>
<i>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.</i>	
Please insert your commentary.	

<b>Method of conception</b>	<b>correct</b>
<i>Assess that student has chosen correct approach or solution methods.</i>	
Please insert your commentary.	

<b>Technical level</b>	<b>A - excellent.</b>
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
The author had to change the behavior of the neural network by editing its codes in PyTorch. This is a very technical issue requiring a high skill level.	

<b>Formal and language level, scope of thesis</b>	<b>B - very good.</b>
<i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	
The text is arranged very good. There are some minor issues, e.g., the acronym ANN is not defined, box dimensions are used as box size, which I find odd, chapter 2.2 is redundant as it has no connection to the thesis, in chapter 2.3. R-CNN is not cited, and other citations are listed at the end of a paragraph instead of directly in the text in an appropriate position. Figure 2.1 is not referenced in the text. These problems are concentrated on 5 pages of the thesis; hence I do not see it as a crucial problem.	

<b>Selection of sources, citation correctness</b>	<b>B - very good.</b>
<i>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.</i>	
I am pleased with the scope of the cited work; however, the format of the Bibliography is inconsistent, albeit only in a few cases. I would strongly advise to avoid citing online blogs and Wikipedia. They should be mentioned if the student drew inspiration from them (e.g., as footnote), but generally one should cite the original scientific works.	

<b>Additional commentary and evaluation</b>
<i>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.</i>

Please insert your commentary (voluntary evaluation).

### III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

*Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.*

I evaluate handed thesis with classification grade **B - very good**.

The thesis presents an interesting idea of injecting the geometry of a scene into a detection neural network. In theory, this should work very well, but the results suggest the opposite. Although there are some qualitative examples explaining the failure cases, there are no conclusive findings of the much worse performance of the proposed system in general. The thesis spans 50 pages, but the text ends on page 26. The rest of the thesis are Figures depicting the performance of individual methods and qualitative results. Given such a large amount of analytic data a more in-depth analysis is expected. There are some minor formal and language issues. Hence, I do not suggest the highest classification and reduce it to B – very good.

Questions:

1. In one of the experiments the input image is divided into 18 smaller parts. Could you explain the motivation behind this? What was the expected result?
2. You mention that YOLOv3 has the actual input as a square. Your input images are rectangular. What measures have you taken so that you do not break the geometry of the scene when changing the size of the input?
3. Faster R-CNN performs considerably better than the YOLOv3 model. However, the literature suggests the opposite. Do you have any comments on this?

Date: **9.6.2022**

Signature: