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ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Car assistant system for road lanes and traffic signs detection**
Author's name:	**Shreetal Upadhyay**
Type of thesis :	Master's Thesis
Faculty/Institute:	Faculty of Mechanical Engineering
Department:	Instrumentation and Control Engineering
Thesis reviewer:	Ing. Adam Peichl
Reviewer's department:	Instrumentation and Control Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **A**

How demanding was the assigned project?

In my opinion, the assignment was extremely difficult and it was basically impossible to meet all goals in such a short time.

Fulfilment of assignment **E**

How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.

Assignment was completed by already made solutions from external sources. The actual benefit of provided source codes is low to none.
There are three separate scripts implemented (all in python): traffic signs classification (CNN), road lanes detection (canny edge detection via OpenCV) and model for Udacity car simulation (so called Nvidia Model CNN) which are similar to ones already presented on github.

Methodology **D**

Comment on the correctness of the approach and/or the solution methods.

The selected methods are correct but they were already implemented and tested before.

Technical level **F**

Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?

The most of the thesis is hardly readable. It feels like for a reader that thesis was assembled from random pieces of text without any logical connection.

Formal and language level, scope of thesis **F**

Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?

The thesis is not logically organized whatsoever. For example section *3.2 Unit Step (threshold)* is dedicated to one specific activation function, then section *3.3 Activation Functions* follows. This section describes two other activation functions (sigmoid and ReLU). Some other sections follow and finally section *3.12 Softmax* is about another different activation function.
Basically whole section *3.10 Backpropagation* is unreadable. For example sentence from page 30 "*The huge advantage of back propagation and it's a key thing to remember is that during the process of back propagation simply because of the way the algorithm is structured.*" does not make any sense.
Equations are on the whole new level. Equation (3.8) from page 27 does not make any sense and uses star symbol (*) for mathematical operation convolution. Equation (3.1) from page 21 uses the same star symbol (*) for multiplication. All the equations from chapter *3.10 Backpropagation* look like copied from somewhere, but for example loss function E is not defined anywhere referencing on figure 14 which is example of max-pooling layer.

Selection of sources, citation correctness	**F**
Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?	
Bibliographic citations basically ignore any citation norm known to me. Some of the sources are (at the best case) highly questionable. For example: [49] - https://github.com/llSourcell/How_to_simulate_a_self_driving_car is a github repository written by Siraj Raval, which was convicted of plagiarism of at least one article and several code projects. Online sources are missing information about accessed date. Cross-referencing is also messed up (for example page 29 - referencing figure 14).	

Additional commentary and evaluation (optional)
Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

In my opinion, the assignment was extremely difficult and it was basically impossible to meet all goals in such a short time. Assignment was completed by already made solutions from external sources. The selected methods are correct but they were already implemented and tested before. The actual benefit of provided source codes is low to none.
The most of the thesis is hardly readable. It feels like for a reader that thesis was assembled from random pieces of text without any logical connection.
The thesis is not logically organized. Equations are also very hard to read with confusing symbol usage. Symbols are not explained. Bibliographic citations basically ignore any citation norm known to me. Some of the sources are (at the best case) highly questionable.

Questions:

1) Please explain 2D convolution (badly presented in your thesis on page 27 equation 3.8).
2) In your models (both NVIDIA and LeNet) you are using several 2D convolutional layers but only one maxpooling layer. What is the purpose of maxpooling layer? How many training parameters maxpooling layer have? Why did you use only one in your models?
3) Explain difference between training, validation and testing dataset?
4) Why did you choose python?

The grade that I award for the thesis is **F.**

Date: **27. 1. 2020** Signature: