FACULTY OF INFORMATION TECHNOLOGY CTU IN PRAGUE

Supervisor's statement of a final thesis

Student:	Vitalii Tokarchyn
Supervisor:	Ing. Jakub Žitný
Thesis title:	Detecting diabetic retinopathy and related diagnoses using Neural Networks
Branch of the study:	Knowledge Engineering

Date: 10. 6. 2020

Evaluation criterion:	*The evaluation scale: 1 to 4.*
1. Fulfilment of the assignment	*1 = assignment fulfilled,* ***2 = assignment fulfilled with minor objections,*** *3 = assignment fulfilled with major objections,* *4 = assignment not fulfilled*

Criteria description:
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.

Comments:
All parts of the assignment are fulfilled, although some of them are not very thorough (described later).

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
2. Main written part	*70 (C)*

Criteria description:
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.

Comments:
The thesis has a reasonable structure; most of the basics are explained in the first part. Sometimes it is a bit difficult to flow through the chapters and keep track of what is relevant to the task. The theoretical part is correct; the sections with medical details are quite thorough. However, the theory of models that are used in the practical part is not provided (Inception, VGG), and some of the preprocessing and tuning techniques are not described at all (choosing the learning rate, CLAHE). Listing all citations at the beginning of Chapter 3 is not correct. Results are communicated clearly and compared to existing literature; however, this is only a matter of two paragraphs, and it is not apparent what metrics are used for comparison.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
3. Non-written part, attachments	*85 (B)*

Criteria description:
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.

Comments:
The repository is good, and the used tech stack is solid. The code is a bit messy, though, but after a few modifications or refactorings, further experimenting could continue.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
4. Evaluation of results, publication outputs and awards	*70 (C)*

Criteria description:
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:

Presented results are fine; the student implemented the whole pipeline from preprocessing to evaluation, used proper metrics, and achieved numbers comparable to the older literature. It is a pity that cross-validation was not utilized. Many more experiments should be tried in order to achieve better results; these include better preprocessing, different architectures (e.g., DenseNet), ensembling, transfer learning, and more hyper-parameter tuning. Also, a more detailed comparison to older results and online leaderboards would be cool.

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:

Not great, not terrible.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
6. The overall evaluation	*72 (C)*

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 student analyzed the problem and implemented a solution that fulfills the assignment, from preprocessing to the evaluation of results. However, many more experiments would be needed to make this project exceptional.

Signature of the supervisor: