THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Efficient Image Recognition on Low-Performance CPUs**
Author's name:	**Martin Jandek**
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	**Department of Cybernetics**
Thesis reviewer:	**Dr. Mgr. Lukáš Kencl**
Reviewer's department:	Electrolux s.r.o., Global Connectivity Architecture

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

How demanding was the assigned project?

Fulfilment of assignment **fulfilled with minor objections**

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.

Some optimizations have worked well, but perhaps some others could be tried, such as restricting input data. State-of-the-art section is missing.

Methodology **correct**

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

Experimental methodology has been adopted, great for this type of work, however, not clear how much of possible optimizations covered.

Technical level **B - very good.**

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?

This work requires deep technical knowledge of image recognition technology, which was demonstrated in practice. Results evaluation and statistical testing could have been more elaborate.

Formal and language level, scope of thesis **B - very good.**

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 level of English is very good, Thesis is easy to read, findings are presented clearly. Nevertheless, the standard sequence of a scientific text is somewhat not respected, proper state-of-the-art section is missing, as well as properly split solution and performance evaluation sections, the Thesis is more of sequential nature as work progressed.

Selection of sources, citation correctness **C - good.**

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?

The items used in etc the work were described very well (OpenCV, Haar, ..), however, alternatives, if any (DNN?), were not described, neither similar optimization works considered for comparison.

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.

Please insert your comments here.

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

This Bachelor Thesis performs an evaluation of particular Image-Recognition technology on a select, widely used, but limited-capacity microprocessor, with the motivation of use in IoT devices. This motivation is highly relevant an represents great value of the work on its own.

It is terrific that the Thesis is written in very good English, which allows sharing with a wider audience.

Considerable technical skill, technology study and simply hard work is required to carry out such practical study, so congratulations to the student on the accomplishment! In particular, I liked the empirical, data-driven nature of the study, with real experiments and measurements giving insights into the role of parameter setting and impact of input data on performance.

On the critical side, I lacked some explanation as to why exactly these particular technologies and microchip were chosen, or better, contrasting to some alternatives. Also, some simple State-of-the-Art of similar optimization studies would have been helpful and fair to position the study.

The Thesis has a bit of a sequential nature as the work progressed, but I would expect a bit stronger performance evaluation section and generally more of the standard technical-article structure. The conclusions are also not fully clear to me.

Given that optimization has revealed importance of parameter setting, perhaps a more elaborate analysis, such as for example Fractional Factorial Analysis, could have been carried out on parameter settings, also varying input parameters, to provide stronger statistical footing, with more data variation.

A comment on the word "optimization" – I am aware the meaning has shifted today, but in general sense it means seeking optimum. Is this work seeking optimum, or improvements? How would one recognize an optimal setting?

All in all, I consider this a very good work full of potential and would really like to see it continue to grow into a more elaborate Master Thesis.

Questions to answer for the student:

1. *In the IoT scenario, for example an oven, the images are likely to be from a very restricted group of type, size and subject (i.e. typed of cooked meat), also may be pre-selected by the user somewhat. How could such knowledge be exploited to further improve the algorithms performance?*
2. *Which of the findings are relevant for this type of processor only, and which could be generalized?*

The grade that I award for the thesis is **B - very good.**

Date: **1.9.2020** Signature: