CTU CZECH TECHNICAL UNIVERSITY IN PRAGUE

REVIEWER'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	Dimensionality Reduction Methods for the Functional Map of the World Dataset
Author's name:	Jan Macek
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Computer Science
Thesis reviewer:	prof. Ing. Jan Faigl, Ph.D.
Reviewer's department:	Department of Computer Science

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment — challenging

Evaluation of thesis difficulty of assignment.

The thesis topic requires a study relatively broad field of deep neural network and approaches to dimensionality reduction, which is, however, sufficiently documented. Besides, satellite imagery represents large datasets, and therefore, efficient processing methods are needed.

Satisfaction of assignment — fulfilled with major objections

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.

From the provided description it is not clear that the assignment has been fulfilled. There is no doubt that state-of-the-art of the related fields has been somewhat explored. Also a solution for the fMoW dataset has been examined. In the thesis, the author describes the implementation of the EfficientNet. However, its implementation is provided by the authors at the github[1] from which the version B0 is utilized. There is a description of existing buildings blocks, but finally existing implementation is chosen. It does not fit to the assignment to implement a new solution.

Method of conception — partially applicable

Assess that student has chosen correct approach or solution methods.

The student selected existing implementation based on the widely applied deep learning framework. Only single network architecture is examined and extensive study of various parameters is not presented. Satellite imagery can be large datasets and it does not seem the student considered available computational resources such as the national grid MetaCentrum or RCI cluster. Furthermore, it is not clear what the quality measures considered to examine performance of the dimensionality reduction methods are.

Technical level — F - failed.

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

Only very brief and vague description of the related terms is provided. It is not clear whether the student understand the problem of dimensionality reduction. An example is a very shallow definition of the artificial intelligence. However, the most important is a lack of the quality measures for evaluation of the suitable methods. Furthermore, a single instance of the EfficientNet B0 is examined for only 10 epochs. Although some results are reported, it does not support the evidence the student understand the field. The results of the comparison are neither quantitative nor qualitative. The student provides vague conclusions such as "*very promising*", or "*performance intensive*" without the supporting evidence.

[1] https://github.com/tensorflow/tpu/tree/master/models/official/efficientnet

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Formal and language level, scope of thesis	F - failed.
Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.	
The text is written excessively poorly. There are so many issues starting from grammar, typos, structure, and typesetting. There is text filling particular parts without added value. There are single sentence paragraphs without the actual content. It is not clear how MNIST dataset is related to the satellite imagery of the assignment. There are repeated sentences in a single paragraph in Section 4.4. The text is describing how a image file is loaded, which does not provide any value. Figures overflow the text size of the paper. Cross references are not properly used, e.g., PC 5.1 should be PC (see Section 5.1), which can be better placed in to a table.	

Selection of sources, citation correctness	E - sufficient.
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.	
The number of references is sufficient for bachelor thesis. However, most of them are online sources that are not properly cited with the date. For some references it is not clear how they are relevant to the thesis topic, e.g., [4] or [18]. It is not clear how processing of EEG signals is related to processing satellite imagery. The selected sources should be more focus on the addressed topic. The student should use more fundamental texts to become familiar with the topic.	

Additional commentary and evaluation
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 hardly got the idea the developed solution might be used in future work. It is not clear whether the student utilized existing methods and apply them on the existing datasets, or if he proposed a novel solution specifically suitable for the satellite imagery. It does not seem so, and therefore, the fulfillment of the assignment is questionable.

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.

Due to the significant flaws of the thesis text, it is not clear the student understand the studied topic. On the other hand, from the provided text, I got the impression the student become somewhat familiar with the topic and at least partially explore dimensionality reduction methods using deep learning techniques. There is also an implementation for processing satellite imagery.

I evaluate handed thesis with the classification grade E - sufficient.

I would like to raise the following questions during the thesis defense.

- What is the total time spent on the thesis?
- What is the time spent on the thesis text itself?

Date: 24.8.2020 Signature: