

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	Semi-supervised learning for spatio-temporal segmentation of satellite images
<b>Author's name:</b>	Antonín Hruška
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Department of Cybernetics
<b>Thesis reviewer:</b>	Boris Flach
<b>Reviewer's department:</b>	Department of Cybernetics

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>challenging</b>
<i>How demanding was the assigned project?</i>	
The assigned task was challenging. Besides requiring to familiarise with recent semi-supervised learning methods in machine learning and adapting one such method for semantic segmentation, the task required to adapt a novel algorithm for semi-supervised learning of generative models (hierarchical variational autoencoders) and to compare it with the chosen existing method.	

<b>Fulfilment of assignment</b>	<b>fulfilled with minor objections</b>
<i>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.</i>	
Almost all goals of the task have been achieved. Both methods have been successfully adapted to the task of semantic segmentation and compared on the citiscapes dataset. What is missing are experiments on Earth observation data.	

<b>Activity and independence when creating final thesis</b>	<b>A - excellent.</b>
<i>Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared for the consultations. Assess the student's ability to work independently.</i>	
Antonin shows an extraordinary combination of theoretical literacy and practical programming skills. He was highly motivated and well prepared for discussions. Moreover, he demonstrated his ability to work independently, to critically analyse concepts and to generate new ideas.	

<b>Technical level</b>	<b>A - excellent.</b>
<i>Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?</i>	
The thesis is technically correct, clearly structured and well written. Antonin demonstrated his ability to employ his knowledge in the field of machine learning in his diploma research.	

<b>Formal level and language level, scope of thesis</b>	<b>B - very good.</b>
<i>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?</i>	
The technical part of the thesis is well presented. The review of the state of art is in my view too detailed in some parts. On the other hand I would have expected a more detailed description of the experiments and their results.	

**Selection of sources, citation correctness****A - excellent.**

*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?*

References to existing relevant work are adequate and clearly distinguished from the contributions of the thesis.

**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.*

The novelty of the thesis consists in adapting an existing semi-supervised learning approach to semantic segmentation and, furthermore, considering a novel learning approach for hierarchical variational autoencoders, adapting it to the same task and, finally, comparing both methods on a semantic segmentation task. One of the prerequisites for achieving this goal was a clear understanding of advanced machine learning concepts, demonstrated by Antonin.

The written thesis is technically correct, clearly structured and well written. It shows, however, some disbalance towards the review of methods and existing work at the cost of the experimental part.

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

*The thesis presented by Antonin clearly and without any doubts fulfils the criteria of a graduation work.*

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

Date: 5.6.2023

Signature: Boris Flach