

**I. IDENTIFICATION DATA**

<b>Thesis title:</b>	<b>Adaptation of CNN Classifiers to Prior Shift</b>
<b>Author's name:</b>	<b>Tomáš Šipka</b>
<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>	Milan Šulc
<b>Reviewer's department:</b>	Department of Cybernetics

**II. EVALUATION OF INDIVIDUAL CRITERIA**

<b>Assignment</b>	extraordinarily challenging
<i>How demanding was the assigned project?</i>	
The assignment required the student not only to familiarize with the state-of-the-art in several machine learning approaches and tasks (deep learning, classification, classifier calibration, prior shift adaptation), but also to extend the state-of-the-art by proposing novel methods for classifier adaptation to prior shift. It required the student to analyze the problem in a theoretical framework, derive solutions to the problem, implement the proposed methods and perform substantial experimental comparison.	
<b>Fulfillment of assignment</b>	fulfilled
<i>How well does the thesis fulfill 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>	
The thesis fulfills all goals of the assignment. Moreover, the proposed methods outperform the state-of-the-art in prior shift adaptation in most cases, as shown in the substantial experimental comparison included in the thesis.	
<b>Activity and independence when creating final thesis</b>	A - excellent.
<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>	
Tomáš Šipka has shown exceptional activity and determination. We consulted regularly, he was always well prepared, and often came with new ideas, proving his ability to work independently.	
<b>Technical level</b>	A - excellent.
<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 sound and contains a considerable amount of clear math definitions and derivations.	
<b>Formal level and language level, scope of thesis</b>	A - excellent.
<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 thesis is well organized and presented. The text is clear and understandable and makes even the complex math formulations easy to follow. The English is technically sound and on a good level.	

**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?*

The thesis reviews related work in the considered topics, i.e. classification, convolutional neural networks, unsupervised domain adaptation, mainly classifier adaptation to label shift. Tomáš Šípka had to familiarize himself with the state-of-the-art from many sources, including books, recent conference and journal publications, and even very recent unpublished arXiv pre-prints. The novelty of his work is clearly defined w.r.t. to the existing methods. All related work is well cited, following citation standards.

**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 quality of the student's work and the impact of the novel methods is also illustrated by the fact that the proposed methods have a patent pending (joint patent application of Toyota and Czech Technical University in Prague). A related paper has been submitted (in review) to an A-ranked conference (WACV).

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

*Summarize your opinion on the thesis and explain your final grading.*

The main goals of the thesis were to review the state-of-the-art in unsupervised adaptation of classifiers to prior shift, to propose new methods to improving weaknesses of existing methods, and to make an experimental comparison. Tomáš Šípka fulfilled all goals of the assignment. Moreover, the proposed methods outperform the state-of-the-art in prior shift adaptation in most cases, as shown in the substantial experimental comparison included in the thesis.

The thesis is well structured, and it properly reviews the related work, including very recent publications. Tomáš Šípka had a pro-active approach and showed the ability to independently analyze theoretical problems, come up with new solutions, implement the solutions, and perform a substantial amount of experiments. The quality of the Tomáš's work and the impact of the novel methods is also illustrated by the fact that the proposed methods have a patent pending (joint patent application of Toyota and Czech Technical University in Prague). A related paper has been submitted (in review) to an A-ranked conference (WACV).

In summary, the thesis Tomáš Šípka meets all goals of the assignment and presents a novel scientific work achieving state-of-the-art results.

The grade that I award for the thesis is **A - excellent.**

Date: **19.8.2021**

Signature: