

I. IDENTIFICATION DATA

Thesis title:	Architecture Optimization for Multiple Instance Learning Neural Networks
Author's name:	Bc. Nikita Tishin
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	CS
Thesis reviewer:	Gustav Šír
Reviewer's department:	CS

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>How demanding was the assigned project?</i>	
This seems like a reasonable experimental assignment based on existing research materials.	

Fulfillment of assignment	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>	
It is fulfilled to the letter.	

Methodology	outstanding
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The scope of the considered and implemented methods looks outstanding to me.	

Technical level	A - excellent.
<i>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?</i>	
The work encompasses much of the latest SotA research in NAS and MIL, which is clearly beyond the scope of regular Masters studies. The technical level and clarity of presentation is professional.	

Formal and language level, scope of thesis	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>	
This is the strongest point of the (already pretty good) thesis. The student is clearly fluent in English. I highly commend the used formatting, diagrams and even the thoughtful choice of colors.	

Selection of sources, citation correctness	A - excellent.
<i>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?</i>	
No problem.	

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. Pose questions that should be answered during the presentation and defense of the student's work.

This is a very nice experimental work the technical level of which, from my point of view, meets the highest academic standards. The technical details are conveyed in a clear and precise manner, and the expository writing is also great. I highly commend the quality of the used formatting and language.

The clarity of presentation does not leave much space for questions, I have merely some high-level suggestions:

- The MIL architectures do not seem principally different from CNNs to me, i.e. per-instance (patch) learnable mapping with shared parameters (convolution), followed by aggregation (pooling) and some non-linear layer(s). Could you elaborate on the main differences of your MIL NAS vs. the existing NAS for the CNNs you mention?
- The same principle is also exploited in Graph Neural Networks, I guess that your NAS could be easily generalized to their search spaces? This could lead to even higher scientific impact (since GNNs are highly popular now, with hundreds of ``new'' architectures being proposed every year).
- Ultimately, it would be interesting to evaluate in the context of relational neural networks and differentiable program synthesis (with first order variables for the instances and parameter sharing), as the algorithms are again similar in principle (only the search space is a bit larger).

Typos:

p.38: Probelms → Problems

p.11: maximized → maximal

I would consistently put space before the opening bracket of each reference.

The grade that I award for the thesis is

Date:

Signature: