Hubert Ramsauer
Institute for
Machine Learning

P +43 732 2468 4481
F +43 732 2468 4539
ramsauer@ml.jku.at

Office:
Birgit Hauer
Ext.4520
birgit@ml.jku.at

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Opponent Review "Interconnected Neural Networks for Multitask Learning" by Lum Ramabaja

I enjoyed reviewing the bachelor thesis "Interconnected Neural Networks for Multitask Learning" by Lum Ramabaja. The thesis proposes a modification to the multi-task learning paradigm of deep neural network, and evaluates it on the toxicity prediction multi-target dataset Tox21, where the task is to predict the toxicity of small chemical compounds.

The thesis is written in a concise, yet readable way. It is self contained and includes all the necessary background knowledge on deep learning, it contains derivations for backprop and an introduction to multi-task learning. References to existing work is present where needed and covers the relevant literature for the topic.

The heart of the thesis is the idea to pose the problem as learning several networks for the individual tasks, with special "connector" weights allowing one-way information transfer from one task to all others. This way, each task can make use of representations learned by adjoined tasks, but does not influence the error flow of each individual task.

The idea is evaluated on the Tox21 data set, which is a relevant data set in this space. It compares the idea to three baselines in two different settings. I especially appreciate the idea of comparing to a multi-task network with the same number of parameters as the proposed new "Interconnected Neural Network", as this gives a good idea of the potential gain in performance. While the results are given without error bars, the text mentions that the experiments were repeated several times, and contains observations about repeatability, which shows that the author did factor in repeatability. Scientifically, the idea seems to have merit, and the evaluation was solid.

I found the thesis to be well written: it explains the idea in necessary detail without getting lost in irrelevant minutiae, in well-written and easy to understand English.

All in all, the thesis meets my criteria for an excellent bachelor thesis, and I am pleased to recommend this Bachelor thesis for ACCEPTANCE with the highest possible degree.

Hubert Ramsauer, MSc