

Bachelor Thesis Review

Faculty of Mathematics and Physics, Charles University

Thesis author	Ilia Zavidnyi		
Thesis title	Transformer Architectures for Multi-Channel Data		
Year submitted	2024		
Study program	Computer Science		
Specialization	Artificial Intelligence		
Review author	doc. RNDr. Ondřej Bojar, Ph.D.	Advisor	
Department	Institute of Formal and Applied Linguistics		

Overall good OK poor insufficient

	good	OK	poor	insufficient
Assignment difficulty		X		
Assignment fulfilled		X		
Total size <small>... text and code, overall workload</small>		X	X	
<p>The thesis submitted by Ilia Zavidnyi examines the very popular Transformer model for the use case of classification of time series data. The interest in this topic stems naturally from the overall success of Transformer-based models in sequence classification or sequence-to-sequence tasks, and from their popularity e.g. as foundation models.</p> <p>Only applying the standard Transformer to numerical time series would not be complex enough for a bachelor thesis, Ilia was therefore asked to examine the multi-channel situation, where more numerical streams are given as the input.</p> <p>The resulting thesis is shorter than the average but this should be seen as a consequence of Ilia's compact and minimalistic writing style, rather than any reflection of e.g. less work done.</p> <p>Ilia reached the goals of the thesis under our (mine and the co-supervisor, Pavel Mrázek from Apple) weekly guidance. It should be noted that the particular topic of numerical inputs to Transformers was new to us, too, so Ilia was doing the exploratory work for us. Ilia was independent and very well self-managed in this quest.</p>				

Thesis Text good OK poor insufficient

	good	OK	poor	insufficient
Form <small>... language, typography, references</small>	X			
Structure <small>... context, goals, analysis, design, evaluation, level of detail</small>	X			
Problem analysis		X		
Developer documentation		X		
User Documentation		X		
<p>The thesis is written in a compact style, very good English and well typeset. The structure of the text is natural and clean. I would like to highlight the clear and very useful schemata that Ilia created for his thesis.</p> <p>As for the analysis part of the work, I value the discovery of a very relevant dataset and Ilia's selection of the actually examined tasks. Considerable effort was also spent on interpreting the data and processing them to the final dataset fit for machine learning experiments. The range of experimental setups could have been broader but I regard it as sufficient for a bachelor thesis.</p>				

Thesis Code good OK poor insufficient

Design	<i>... architecture, algorithms, data structures, used technologies</i>		X		
Implementation	<i>... naming conventions, formatting, comments, testing</i>	X	X		
Stability			X		
<p>The architecture design is clean and predictable. I would like to highlight that the selected networks were implemented by Ilia on his own, using PyTorch and PyTorch Lighting. The stability of the implementation was validated in the conducted experiments.</p>					

Overall grade Excellent
Award level thesis No

Date

Signature