



Review report of a final thesis

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Thesis title: Artificial Intelligence in Home Interior Design: Neural Networks for Combinations of Patterns and Accessories
Branch / specialization: Knowledge Engineering
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Evaluation criteria

1. Fulfillment of the assignment

- ▶ [1] assignment fulfilled
- [2] assignment fulfilled with minor objections
- [3] assignment fulfilled with major objections
- [4] assignment not fulfilled

The difficulty of the assignment corresponds to the standards of bachelor theses. All the tasks in the assignment were fulfilled.

2. Main written part

70/100 (C)

The text of the thesis is exceedingly extensive. The author organizes the bachelor's thesis unnecessarily into a large number of chapters (9). For example, Chapter 4 explains on one page how the author solved data preprocessing and feature extraction. This chapter could have easily been part of Chapter 5 about data preprocessing. Likewise, Chapter 6 discussing the libraries and used models should be part of Chapter 7: Implementation. The paper is written in English with a moderate amount of typos (like "handcrafted") and grammatical issues such as the missing subject ("At the article deals with the evolution").

The thesis is inconsistent or incomplete in terms of marking and formatting, for example: Figures are sometimes called as "Images", e.g. "Image 6.1".

The formula in Section 3.2.2 is not inline nor in the center. Moreover, "sign" is a function, so using $\text{sign}\{x\}$ and $f(x)$ does not make sense.

Label of Figure 3.1 presenting perceptron is "CNN model".

Section 3.2.4 contains the sentence "The 3.1 shows a scheme of RNN" while Figure 3.1 is showing a perceptron.

Description of Figure 3.2 presenting RNN is "CNN model" with missing reference.

The star symbol is defined as a convolution operator in Section 3.2.5, but the author uses this symbol in previous sections to multiply two numbers.

Almost all abbreviations are defined repeatedly, like "Graph Convolution Neural Network (GCN)" is in the text at least five times, similarly for CNNs and GNNs.

Overall, the text of the thesis could use some polishing, as many small errors bring it down.

3. Non-written part, attachments 95 /100 (A)

The zip file attached to the system does not contain all the images or saved weights of the models due to the maximum size limitation, but the author provided me with everything after submission, including a file describing the installation of all the libraries used in the thesis. The attached code is clear and consists of multiple jupyter notebooks and supporting py files that are logically organized, although sometimes duplicated. In order to perform the entire experiment, it was necessary to study and use non-trivial libraries such as PyTorch Geometric. In Chapter 6, the author lists libraries used during the thesis including Tensorflow. However, this framework is used absolutely minimally in the code, and on the other hand, the code-dominant PyTorch framework is not mentioned in the list of libraries used.

4. Evaluation of results, publication outputs and awards 92 /100 (A)

The amount of work done is above standard. The author had to cope with the automatic download of the dataset (using selenium), its preprocessing for feature extraction using YOLOv7 and VGG16, and then combining the features using graph neural networks. Due to the large scale of the work, none of the parts are perfect, but together they form a functional complex. The output of each part of the work is attached so that it can be built upon in other work that will focus on one or two parts and refine them to perfection.

The overall evaluation 88 /100 (B)

Overall, this is a good bachelor thesis, which had to take an excessive amount of time due to the number of subtasks. The author had to study and apply knowledge from many disciplines (web scrapping, data analysis, deep learning, design) to create this thesis. The quality of the work is slightly diminished by the written part of the text, which deserves to be checked and polished.

Questions for the defense

There are "six of the most common interior styles" listed in Section 5.1.2, but since the images downloaded from Google Search data were manually labeled by you (as described in Section 5.1), how do you classify these "style" classes during annotation? And did you choose these six styles/classes: bohemian, contemporary, farmhouse, industrial, modern, traditional?

Instructions

Fulfillment of the assignment

Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.

Main written part

Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies?

Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 52/2021, Art. 3.

Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.

Non-written part, attachments

Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.

Evaluation of results, publication outputs and awards

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

The overall evaluation

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.