

I. PERSONAL AND STUDY DETAILS

Student's name: **Korotina Ekaterina** Personal ID number: **479404**
 Faculty: **Faculty of Biomedical Engineering**
 Study program: **Biomedical and Clinical Engineering**

II. EVALUATION OF THE MASTER THESIS

Masters's thesis title in English:

Exploring and comparing data selection methods in the pre-processing step of a deep learning framework for automatic tumor segmentation on PET-CT images

	Evaluation criteria	N. of points
1.	<p>Fulfillment of the aim of the thesis and suitability of the structure of the thesis with respect to the topic (compliance with the assignment). (0 - 30)*</p> <p>Each assignment, or rather any part or sentence from the assignment has to be dealt with, 20 points can only be given for a fully fulfilled assignment. Reduce the number of points with respect to the part of the assignment that is not adequately dealt with. Stating the aim in the introduction is compulsory and if the student fails to state the aim, he/she loses 10 points. The total of 30 points can be granted only to a flawless and precisely prepared thesis.</p>	28
2.	<p>Theoretical level and application of accessible sources. (0 - 30)*</p> <p>The role of the reader is very important here. It is as follows: if most of the text is adopted, then the student gets only 5 points. If everything is written by the student, in his/her own words, he/she may get maximum 15 points. Additional maximum 15 points can be added for appropriate and complete processing of accessible sources, i.e. state of the art is described in an independent chapter (5 points), important and relevant sources are commented on including the description of the selection process (selection strategy 5 points). All sources are adequately cited. The composition of the cited sources is also judged, i.e. whether they reflect the state of the art and are related to the topic, general sources such as mathematical formulas etc. are not included in full-bodied citations. The ratio of these sources can be calculated i.e. useful / not useful sources and the ration has to have impact on the evaluation (5 points).</p>	26
3.	<p>Scope of experimental work (SW, HW) and applied knowledge, quality of the methodology and conclusions of the thesis. (0 - 30)*</p> <p>If the thesis is a combination of theoretical deductions (4 points - can be replaced by a paper in English), modelling and simulation (4 points), SW implementation (4 points) and technical realization (4 points - can be replaced by a patent or utility model) and 4 points for functionality of both SW and HW - then the student can get up to 20 points. If the thesis has the correct structure including the discussion (5 points - at least 2 A4 pages) and conclusions (5 points - at least one A4 page) then another 10 points can be added. It means 30 points for a complex and flawless thesis which includes some outcomes in projects, papers, patents or utility models.</p>	24
4.	<p>Formal requisites and layout of the thesis (writing mastery, structuring, graphs, tables, citations in the text, list of references etc.). (0 - 10)*</p> <p>Currently, students have materials explaining how to prepare a professional text on PC, they have all knowledge and skills; therefore it is not necessary to make allowances for the quality of PC processing. The list of contents of the thesis should have decimal system. Consider references between the individual parts including numbering of equations, pictures, tables and graphs (1 point), quality of pictures (1 point), number of spelling mistakes (1 point for just a few), whether it contains important features with respect to the type of the thesis (2 points). Only standard terminology should be used especially in the English language (ability to express oneself with the use of professional language - 2 points), if graphs are according to the rules (see tolerance and influence of statistical processing - 1 point), if there are relevant captions for graphs and tables and everything is readable (1 point), observance of citation rules ISO690 and ISO690-2 (1 point).</p>	6
5.	Total points	84

* Verbal evaluation should be part of the Comments

III. PROPOSED QUESTIONS FOR THE DEFENSE (OPTIONAL)

1. In testing phase - you used only one model (Model 8) to represent the Fuzzy C-means clustering technique compared to 6 datasets created by K-means clustering, which was based on all used features selection. What made you choose this specific model as the representative technique.

2. Can you explain what caused repeated spike occurrence in validation functions value (Figures 20., 21., 22) - what does the spike occurrence represent? Why some models were more susceptible to them than others?

3.

IV. THE OVERALL ASSESSMENT OF THE LEVEL OF THE MASTER THESIS

Grade**:	A (excellent)	B (very good)	C (good)	D (satisfactory)	E (sufficient)	F (failed)
Number of points:	100 - 90	89 - 80	79 - 70	69 - 60	59 - 50	< 50
	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

** in case of F (failed) please explain in detail

I give the above grade to the master thesis and I recommend/~~do not recommend~~ it for the defence.

V. COMMENTS

In my opinion, this work contains everything master thesis should contain and the topic, which is focused on currently more and more popular topic of medical image segmentation and one of its problematics, are described very well. Both theoretical and practical parts of the work show lot of effort put into them and all objectives stated in the introduction were focused on and fulfilled.

The problem i see with this work is its layout and formal structure. Some chapters are illogically placed or have wrong order ("Discussion" precedes "Results" here, chapter Methods is missing (incorporated into "Data" chapter), "Introduction" chapter goes straight into "Background" subchapter without giving us the summarized context of this work) which can sometimes lead into problems understanding the point/context and slightly chaotic representation.

This work frequently cites another work/project ([3]), from which it comes and which it tries to improve, which is shortly mentioned in introduction. I would suggest a bit more extensive description of that project (this was causing slight context problems- for example during final evaluation based on using newly created datasets for segmentation- which took parameters for neural network from the original work ([3]) to show the improvement- those parameters, or the segmentation model were not properly described in this work, so you have to go through the original work to look them up).

For the formal structure, there were few problems with figure description (missing description/figure, description misplaced and disunited description format) and figures/graphs format- most of them were too small or had such low quality to properly evaluate- in medical images that comes with lower resolution this can be understandable, but most of graphs were too small/"crowded" which can lead to their incomprehensibility. Some graphs could also be better explained/lacked easily understandable legend.

Overall i rate this work as very good, where while it sometimes lacks in structure and format clarity, regarding content it fullfills all requirements and shows large amount of work put into its completion and would like to see future developement in this topic based on results contained in this work.

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