FACULTY
OF INFORMATION
TECHNOLOGY
CTU IN PRAGUE

Review report of a final thesis

Reviewer:	Mgr. Petr Šimánek
Student:	Bc. Martin Vatrt
Thesis title:	Performance Optimisation of tH(bb) Signal and Background Separation Using Machine Learning
Branch / specialization:	Knowledge Engineering
Created on:	5 June 2023

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

All the tasks were fulfilled. Also, the bonus part was approached.

2. Main written part 90 /100 (A)

The thesis is very well written with few errors (which are easily understood, e.g. citeoptuna in the text). Some methods are mentioned, but not cited (or cited in cited literature), for example, what is the foam algorithm? The software was used in accordance with the licenses.

3. Non-written part, attachments 90 /100 (A)

The student apparently understood and could change and connect a very specialized software.

4. Evaluation of results, publication outputs and awards 85 /100 (B)

The result seems to show competitive sensitivity and also AUC.

The overall evaluation 95 /100 (A)

Overall, it is clear that the author had to understand a huge amount of domain-specific problems and codes (in particle physics) and later applied machine-learning models. These models are standard but applied in clever and well-explained ways. The results

seem to be very relevant and important. Also connecting all the used workflows is an achievement.

Questions for the defense

How were the data normalized when modeled by neural networks?
Can the analysis be run on cloud or is it possible only on lxplus? And why?

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.