FACULTY OF INFORMATION TECHNOLOGY CTU IN PRAGUE

Supervisor's statement of a final thesis

Student:	Georgiy Ivannikov
Supervisor:	doc. Dr. André Sopczak
Thesis title:	Evaluation of Analysis Frameworks in the ATLAS Experiment at CERN and Design of an Optimized Framework for the Search and Determination of Properties of New Particles
Branch of the study:	Information Systems and Management

Date: 17. 1. 2021

Evaluation criterion:	*The evaluation scale: 1 to 4.*
1. Fulfilment of the assignment	*1 = assignment fulfilled,* ***2 = assignment fulfilled with minor objections,*** *3 = assignment fulfilled with major objections,* *4 = assignment not fulfilled*

Criteria description:
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.

Comments:

The thesis follows in structure the assignment. The objectives are clear and largely fulfilled. The requirements of the analysis framework are defined. Georgiy participated in several analysis meetings of a small analysis group which specifically studies one aspect of the Higgs boson analysis. The thesis should have made more clear the relation between this one specific analysis which was analyzed and the generalization to other analyses. The existing framework is analyzed with respect to usability, performance, data structure, and resources. The thesis addresses the outline of a new analysis structure only briefly with respect to different analyses (top-Higgs and axion-like-particle). A new documentation strategy is well addressed. The performance test is simplistic and could have been more extended and detailed. The evaluation of the existing analysis framework is done and suggestions for improvements towards a new framework are made. An outline of a new analysis framework would have been desirable.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
2. Main written part	*75 (C)*

Criteria description:
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. 26/2017, 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.

Comments:

The thesis is adequate in contents and scope. All aspects are meaningful and necessary. The contents is correct. Some aspects are inaccurate and should have been expanded more, namely the relation of the specific analysis and other ATLAS analyses, also the performance test should have been extended. The thesis has a natural flow with a logical structure. Overall it is comprehensible to readers who are not familiar with the ATLAS analysis framework. Specific results of the example analysis are difficult to understand without given significantly more detailed on the goals and methology and challenges of the analysis. The English and style is adequate after a few iterations of the draft. The relevant sources are properly used and cited. They follow the standard. No specific copyright or license terms were needed.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
3. Non-written part, attachments	*80 (B)*

Criteria description:
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.

Comments:

Georgiy was able to install and implement the existing analysis framework. Natural difficulties he resolved well with adequate communication of the developers. As the existing analysis framework is development, Georgiy faced new challenges, and directly noted the shortcomings in the development phase. He has been very familiar with the gitlab system and made useful suggestions how to combine progress monitoring and gitlab usage. Overall his suggestions for improving the existing analysis framework are rather minor and no overall resign for a new generalized framework was proposed. His use of existing technology (gitlab, python, C++, root analysis tools) was good and showed his own experience in project programming. His approach of software implementaion/development has been systematic and efficient.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
4. Evaluation of results, publication outputs and awards	*75 (C)*

Criteria description:
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.

Comments:

Some of his ideas developed in the course of his thesis has been very useful, for example the relation between JIRA and gitlab. Also, his evaluation of the lack of documentation and suggestions for new approaches have been very useful and could serve further software development in the analysis framework. This could be deployed in practice. The already existing analysis structure developed for a specific research has not been generalized in the context of other analyses, and his main findings and suggestions are limited to the existing analysis framework.

Evaluation criterion:	*The evaluation scale: 1 to 5.*
5. Activity and self-reliance of the student	*5a:* *1 = excellent activity,* ***2 = very good activity,*** *3 = average activity,* *4 = weaker, but still sufficient activity,* *5 = insufficient activity* *5b:* *1 = excellent self-reliance,* *2 = very good self-reliance,* ***3 = average self-reliance,*** *4 = weaker, but still sufficient self-reliance,* *5 = insufficient self-reliance.*

Criteria description:
From your experience with the course of the work on the thesis and its outcome, review the student's activity while working on the thesis, his/her punctuality when meeting the deadlines and whether he/she consulted you as he/she went along and also, whether he/she was well prepared for these consultations (5a). Assess the student's ability to develop independent creative work (5b).

Comments:

Georgiy has been very motivated and participated very well in personal and online meetings. He has been very reliable and timely in fulfilling assigned suggestions. Further initiatives beyond specific assignments would have been desirable. Overall, Georgiy has been a good and pleasant communicator, also with other members of the analysis team.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
6. The overall evaluation	*80 (B)*

Criteria description:
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.

Comments:

Very positive in his thesis work has been his commitment and reliability. The result of his evaluation of the existing analysis framework and the way how the framework development takes place has some new aspects. This is useful for future collaboration between the analysis team members. The placing of the specific framework in a context would have lead to more significant results. The complexity of the historically grown data analysis in the ATLAS analysis framework, made it a difficult task to come up with a new concept, and therefore the thesis concentrated on improvements of the existing framework. Georgiy gave reports in the ATLAS analysis team on his work, which were clear and well received.

Signature of the supervisor: