**FACULTY
OF INFORMATION
TECHNOLOGY
CTU IN PRAGUE**

Review report of a final thesis

Reviewer:	Ing. Jakub Klinkovský, Ph.D.
Student:	Bc. Karel Vrabec
Thesis title:	The Development of a New Visualization Tool for the IKEM
Branch / specialization:	Software Engineering
Created on:	27 May 2024

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 goal of this thesis was to develop a new web application for the visualization of medical data, using the technologies that power ParaView, a popular and powerful visualization application, and simplifying some its workflows for doctors and scientists from IKEM. The assignment is rather vague, but fortunately, the customer was able to provide extensive and useful feedback during the development of this application and in the end, the customer seems to be satisfied with the final product. Hence, I can conclude that the thesis fulfils all objectives and even contains features not covered by the assignment.

2. Main written part   90 / 100 (A)

The thesis is written in a nice and readable English language, but sometimes the wording feels too informal for this type of text. I did not notice many grammatical errors, one of the few comments is that it would be better to use "singular they" instead of phrases like "he or she" or "his or her". From the typographic point of view, I was disturbed by inconsistent styles of citations, such as ". [1]" vs "[1]." or even "[3]. [4] [5]". The bibliography contains mostly online resources, which is probably typical for this type of works. All citations are to the point and used correctly, but some terms or projects (e.g. the Balsamiq and Axure tools that were used for wireframe and prototype design) are mentioned without a corresponding citation. Finally, there are no licensing problems with this work as it is based on free and open-source software.

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

The software project has very high quality, from the initial design to the final implementation and code formatting. I very appreciate that the thesis deals with not only the design requirements and final outcome, but mainly with the actual development and architectural design. The project uses modern technologies for the development of web applications and the thesis evaluates even other frameworks, that were considered but not used in this project. This will provide useful insights for others developing similar applications or extensions of this application.

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

The goal of the project was to develop a new web application for the visualization of medical data for doctors and scientists from IKEM. The resulting application is based on Trame, a modern web application framework developed by Kitware, which allows to seamlessly integrate VTK with modern web technologies. As I wrote in the first comment, the project fulfils all objectives of the assignment and even contains new features based on timely feedback from the researchers working for IKEM. The application has been already deployed, tested with several usability test scenarios and provides an excellent groundwork for future development.

The overall evaluation   100 /100 (A)

Besides minor language and typographic issues, the thesis and its accompanying software project are excellent and deserve to be awarded the grade A.

Questions for the defense

I have several questions/comments for the defense:

1. The application has a restriction on loading max 10 files of max 100 MB. How reasonable are these limits and what would have to be changed if the user wanted to visualize larger datasets? What is the actual memory usage of the application on the client side and on the server side when the user loads the largest dataset possible?

2. The thesis mentions input data anonymization, but I missed how/where it is actually done. Is it a pre-processing step in the application or an assumption/requirement on the input that must be satisfied before the application can load the data?

3. Is it necessary to describe personas with a name and gender? These attributes are too specific and cannot substitute typical values from a group of users that the persona represents. I would describe personas in general without these attributes, but it might be a convention established in the field of UI design.

4. In chapter 6, it would be nice to provide links to the deployed application and public datasets used for testing, so the reader could download the data and try the application.

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.