

DIPLOMA THESIS EVALUATION

Student's name and surname: Akhilesh Ashokkumar

Name of the diploma thesis: Creation of 3D models of objects using alternative applications

Supervisor of the thesis: Ing. Radomír Mendřický, Ph.D.

1. Diploma thesis evaluation

Evaluation	excellent	excellent minus	very good	very good minus	good	failed
Meeting the goal and fulfilling task of the thesis		X				
Quality of conducted survey			X			
Methodology of solutions			X			
Expert level of the thesis				X		
Merit of the thesis and its potential applicability of results			X			
Formal and graphic level of the thesis				X		
Student's personal approach			X			

Mark x in the corresponding box.

Supervisor's final evaluation is based on his/her overall subjective evaluation.

Grading is stated literally in the article no. 5, neither by a number, nor by a letter.

2. Comments and remarks on diploma thesis:

The main goal of this thesis was to make a practical comparison of professional systems for 3D digitization and alternative approaches and applications for creating 3D models.

In the introductory part of the work, the author conducted a search of the current state of knowledge. The theoretical part also provides an overview of available software for creating models by photogrammetry and introduces several selected applications, which are further used in the practical part. Its main content is a detailed comparison of the quality and accuracy of outputs from four photogrammetric softwares with a reference model created by digitization with a 3D scanner ATOS III TripleScan.

Overall, I rate the work as relatively successful. The author fulfilled the assignment and specific goals. Unfortunately, I have a few key comments on the expert level of the work that reduce the overall assessment:

- the division and structure of the text is sometimes quite confusing (e.g. first the work with the finished model is described (chapter 3.4) and only in the following chapter (chapter 4) is it stated how the model was created using photogrammetry
- software output formats listed in tab. 1 often do not correspond to the information in the text section



- some essential information about the procedure and the used methodology is missing (e.g. principles when taking photographs) and about the creation of the models (model calculation time, point cloud density, HW requirements of computer technology for the used SW)
- with regard to the high local deformation of most models, some of the selected criteria (procedures) for assessing accuracy are unsuitable and numerical results misleading (subjectively it is clear that e.g. the model generated by Meshroom / Nikon is below average in terms of quality, although numerically in table 6 is rated as the best); however, the calculation is correct, but the results are inappropriately commented and interpreted; here I would recommend evaluating the error better according to the standard deviation when calculating the colour map of deviations on the CAD model, not on Mesh
- it follows from the above that some of the conclusions drawn are not entirely adequate
- the bibliography also contains Czech texts ("dostupné"), although the thesis is in English

Despite these comments, I evaluate this thesis as a whole positively. A number of relatively technically and time-consuming experiments and measurements are performed. From the point of view of outputs and results, it can be stated that the author has met the requirements and objectives of the assignment and some of the presented procedures for creating 3D models can alternatively be used to advantage in practice.

3. Questions about diploma thesis:

- 1) According to what criteria (why?) did you choose the just mentioned 4 applications from a large number of SW for photogrammetry?
- 2) Explain why subjectively (by mesh, by color map of deviations) they seem to be the most accurate results for Autodesk ReCap Photo and Agisoft SW, but according to the average deviation in alignment, these SWs perform worst (they have the largest deviation).

4. Supervisor's statement on results of the inspection carried out by the anti-plagiarism program in the STAG system:

Based on the analysis of the STAG system, it can be stated that the work is original. The compliance rate according to the STAG system is 0%.

5. Supervisor's grading of the diploma thesis:

Final evaluation of this thesis: *very good*

Date: 15. 6. 2021, in Liberec

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Supervisor's signature

