DIPLOMA THESIS EVALUATION

Student´s name and surname: Lakshman KumarRamesh

Name of the diploma thesis: Measuring the accuracy of digitization of contactless scanners

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 aim of the work was the practical verification and determination of the accuracy of digitization of selected contactless 3D scanners in accordance with the procedures used for calibration (acceptance tests) of these devices.

In the introductory part of the work, the author conducted a detailed search of the current state of knowledge. The theoretical part also provides information on the principles and technical parameters of the scanners used. I positively evaluate the information about the so-called acceptance tests, which are used in practice for the verification of optical scanners. The extensive practical part of the work clearly acquaints with the used scanning methodology by individual systems, the method of inspection in SW GOM Inspect and above all brings a lot of results that show the true accuracy of measuring five frequently used scanning systems. This information is very valuable, as it demonstrates not only the absolute differences in the accuracy of measurements between systems of different manufacturers, but also the dependence of the results on the resolution used or the variability of deviations depending on the monitored parameter.

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

- in chapter 2.3 there is probably a wrong reference to the literature (it should be correct [8])
- the same phrases or sentences are repeated quite often (sometimes even whole paragraphs - e.g. p. 33, p. 47 - 49)
- some information is inconsistent - from the point of view of context, sometimes different information is presented in irrelevant places
- there are relatively many minor but also major inaccuracies and errors in the text (e.g. point 6 on page 59; reversed description (with regard to resolution) in Fig. 43 and 44, respectively 48 and 49, etc.)
- it is evident that for the text it is excessively drawn from the literature - it would be appropriate to involve more of your own invention
- graphical evaluation would be better to implement e.g. in the form of so-called "box" charts to be evident sign of the error and its range for individual measurements
- the bibliography also contains Czech texts ("dostupné"), although the thesis is in English

Despite these comments, I evaluate the thesis as a whole positively. To obtain relevant results, the student had to process and evaluate a large amount of data, which, with few exceptions, he did very well. From this point of view, it can be stated that the author has met the requirements and objectives of the assignment and the outputs of the work will contribute to the expansion of the field of science, as it brings new information about the accuracy of contactless measuring systems.

3. Questions about diploma thesis:

1) Can you clearly (e.g. in the form of a summary graph) show and explain what effect the set scanning resolution (for the MetraScan system: 1 mm vs. 0.2 mm) had on the individual monitored parameters? How do you explain the significant increase in element shape error (sphericity) at higher resolution?

2) Which system with regard to accuracy, measurement principle, price, etc. would you use (recommend) for different areas of interest (industry - science - education / inspection - reverse engineering - documentation of monuments, etc.)?

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: *Excellent minus*

Date: 15. 6. 2021, in Liberec

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Supervisor´s signature