Brno University of Technology
Faculty of Information Technology

Review of Master's Thesis

Student: Bambušek Daniel, Ing.
Title: User Interface for ARTable and Microsoft Hololens (id 20106)
Reviewer: Španěl Michal, Ing., Ph.D., UPGM FIT VUT

1.   Assignment complexity   **more demanding assignment**

The assignment represents a complex task that requires the student to become familiar with both the Microsoft HoloLens device and the existing experimental ARTable platform developed by the research team Robo@FIT, as well as, with the robot programming and potential use of the augmented reality. The solution had to be designed, implemented and verified by the student himself, what is a great deal of work.

2.   Completeness of assignment requirements   **assignment fulfilled**

3.   Length of technical report   **in usual extent**

4.   Presentation level of technical report   **75 p. (C)**

The technical report is well written. The introductory part with the background and description of existing technologies is very nice and readable.
However, description of the implementation is a bit unclear and should be supplemented, at least occasionally, by images or diagrams. Some parts of the implementation (design of the visualization part, etc.) should rather be presented in the chapter dedicated to the solution design.
Description and evaluation of experiments is also slightly hard to read. It would be better to describe each experiment and its results separately and make an overall summary at the end of the chapter.

5.   Formal aspects of technical report   **75 p. (C)**

I appreciate the technical report in English. The language is good, sometimes there are mistakes in the use of articles, proper structure of sentences, or prepositions. In some parts, these mistakes are more often. The typography of the work is fine.

6.   Literature usage   **90 p. (A)**

The literature is very broad and covers the necessary topics. It includes both documentation of relevant technology and scientific articles on modern approaches to robot programming using AR. Chapter 5.1 on existing AR solutions is too brief, it lacks recommendations on how to design a new AR solution.

7.   Implementation results   **95 p. (A)**

I have had opportunity to test the final solution. It is impressive and fully functional and it demonstrates excellent results achieved, and the amount of work the student did.
The technical solution is complex and it is not easy to locate the parts created by the author. At least a short description of the structure would be very helpful. The source code should have been more commented.

8.   Utilizability of results

This is a research work that fits into Robo@FIT's activities. The author designed and carried out extensive experiments which indicate the potential benefit of the augmented reality as well as shortcomings of the proposed solution which could be further addressed.
I do not find the robot programming experiment designed ideally. Its evaluation based on the task execution time does not measure benefits of the new AR solution rather pros and cons of the original robot programming principles - the UI projected on the table.

9.   Questions for defence

- Please explain why did you choose execution time as the metric for the programmin task? Do you have any other better metric for evaluating a task?
- Have you considered comparing your AR solution with the programming by demonstration approach?
- What was the accuracy of the HoloLens and ARTable calibration using the calibration pattern on the opposite side of the table?

10.   Total assessment   **90 p. excellent (A)**

The topic of this diploma thesis is of innovative character and the author presents very nice results on the difficult topic. He has been able to connect all the necessary technologies and bring the solution up to a functional application. The technical report could be better. However, considering the difficulty of the topic, I consider the work to be excellent.

In Brno 8. June 2018

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