

I. IDENTIFICATION DATA

Thesis name:	Device for small-range localization of searched objects
Author's name:	Bc. Vít Neckář
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Computer Graphics and Interaction
Thesis reviewer:	Ing. Matěj Klíma
Reviewer's department:	Department of Computer Science

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<p>This master's thesis topic is very challenging; the discussed small range locators are a very actual topic, and the implemented system can be beneficial.</p> <p>To satisfy the assignment, the student must prove skills in various topics, such as analysis of the state of the art, analysis, design, implementation, and evaluation of both hardware and software parts of the system. Lastly, the student must prove a certain academic level to document the process in the thesis appropriately.</p>	

Satisfaction of assignment	fulfilled with major objections
<p>The author correctly analyzes existing solutions and the technology they use. His locator is different from the existing solutions by not needing the smartphone to search for lost items, which he reasons well in the text. Appealing storyboards well describe the results of the user research.</p> <p>The description of the design and implementation of the solution is present in the thesis. Also, there is documentation of the construction of final prototypes.</p> <p>The author provides information about the iterative formative evaluation of the prototypes.</p> <p>However, the author implemented only the tag device and smartphone application out of the presented subsystems (the main controller, the tag, and the doorkeeper). He uses a mock instead of the user controller, and the functionality of the doorkeeper he simulates with the help of the user tests facilitator.</p> <p>The major objection is as follows, from the assignment seems that the student should perform user tests with the system's prototypes and, based on the results, create the final solution and perform another round of user tests among it. However, the author describes only one round of user tests in the text. And some crucial problems that emerged from the tests are not appropriately reflected. The correct selection of the speakers to be loud enough yet small is so important that the author should reflect it by another round of prototype design, construction, and user testing process.</p>	

Method of conception	partially applicable
<p>The only system student implemented in the thesis is the tag. The selection of the ESP32 system on a chip microcontroller was good. It is reliable, efficient, robust, small, and contains the crucial BLE feature, yet it is still very cheap, making it ideal for prototyping.</p> <p>Instead of exact battery settings, the student uses some power bank as the power source for the tag, which seems improper for this use case.</p> <p>The selection of speakers the student himself evaluates as a source of problems.</p> <p>Instead of the doorkeeper and main controller, the student implemented the tag control application for smartphones. This application seems very basic, and there is not much to comment.</p> <p>On the other hand, the Thinkable tool seems like a good choice for the selected purpose.</p>	

Technical level	D - satisfactory.
<p>The technical level of this thesis is not very pleasing. In the analysis chapter, there is no complete overview of the functional and non-functional requirements of the system. In the chapter about the design of the system, the author doesn't use any model that would specify the architecture of the system. There is only a very high-level description of the three main parts of the system and the user scenarios. The only model present in the design chapter, the hierarchical task analysis model should be part of the analysis chapter. Same as the user scenarios specified there. Moreover, the description of the technology in chapter 5 Implementation should be moved to the design chapter.</p> <p>The author documents the hardware implementation of the tag adequately by the diagram in Figure 5.5. However, the software implementation is documented only by code samples, and no high-level diagram is used, which would make the understanding of the implementation easier for the reader.</p> <p>On the other hand, the formative evaluation of the prototype seems to be performed and documented correctly.</p>	
Formal and language level, scope of thesis	B - very good.
<p>The thesis contains very few language errors. It is very readable, consistent, and well arranged.</p> <p>On the other hand, the author sometimes uses the very informal statement, e.g., "A small introduction to a technology, which is used for the creation of our prototype, should not hurt anybody." In chapter 5.</p> <p>Also, the quotes at the beginning of some chapters don't fit into the academic publication.</p>	
Selection of sources, citation correctness	B - very good.
<p>The author uses a fair amount of 34 references. They primarily lead to the official websites of various manufacturers. There are also some references to the academic papers and some references to educative websites. On the other hand, the author makes some statements for which he does not provide a satisfactory explanation, e.g. in Chapter 4: "The tag must not be too big, about 5 by 2,5 cm, with thickness about 0,5 - 1 cm, but definitely not more.". Or: "The battery must last a long time, preferably at least a year." Or: "The ideal size estimated would be about 20 cm high, 7 cm wide and 1.5 cm thick. I would set the weight at 200 g."</p>	

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

The author's writing style is very well readable and without grammatical errors. He describes everything very clearly, and the formal level of the thesis is at the expected level. The selection of sources is ok. The formative testing seems to be performed correctly.

However, the technical level of the product and its documentation is not very pleasing. In my opinion, the final product should be more advanced. Not just a mock of the user controller, not a tag powered by a power bank, and not a doorkeeper simulated by the tests facilitator. Moreover, the analysis chapter should contain the list of requirements, the design chapter should contain some diagrams of the architecture, and the implementation chapter should describe it from a higher level and with the help of some standardized diagrams.

I evaluate handed thesis with classification grade **D - satisfactory**.

Date: **30.5.2022**

Signature: