

I. IDENTIFICATION DATA

Thesis title:	Robotic eaves cleaner
Author's name:	Grapci Drin
Type of thesis:	bachelor
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Instrumentation and Control Engineering
Thesis reviewer:	Ing. Jaroslav Bušek, Ph.D.
Reviewer's department:	CTU in Prague – FME, Department of Instrumentation and Control Eng.

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>How demanding was the assigned project?</i>	
<p>Although the thesis deals with the design and implementation of a relatively modern device, the implementation of which is currently possible thanks to the progress and availability of modern technology, I evaluate the assignment or the difficulty of the work as moderately demanding. In my opinion, the main challenge is the correct selection of the movement concept of the proposed robot, which should be preceded by a good research. The mechanical design and wiring of the control electronics can then be consistently designed and the concept can be easily implemented.</p>	

Fulfilment of assignment	fulfilled with major objections
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
<p>Not all tasks were completed. The design of the mechanical parts is not consistent. The work is concluded with the assembly of parts, but it is not complete. The selection of parts is merely a list. Their suitability is in some cases questionable. Many critical components are not addressed at all (control, power supply etc.). Assembly and experimental verification, which are essential for the given topic, are completely missing.</p>	

Methodology	partially applicable
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
<p>Although the practical part is preceded by quite extensive research on relevant topics, the description of the actual results is brief. It essentially contains only a list of selected components, which is supported by a minimum of calculations. Student has chosen an AiRo robot concept for his design that is applicable to the desired usage, but the student's contribution is minimal if not non-existent. Only a 3D design and photographs of 3D printed parts for one segment are presented. The documentation completely lacks photographs of the resulting robot. The text does not contain a description of the control. It is not clear how the robot should be controlled. Feedback to the operator is not discussed. Even the design of the control board and power parts is not sufficient. Again, it is only a list of components. The solution of the robot power supply is completely missing. Wiring diagram is missing too. There is no description of control algorithm.</p> <p>The methodology presented is not consistent. Although the student has done reasonable research on potential solutions, the description of his own solution does not give the feeling that the device has been completed. There are no proofs of that presented. This section raises many questions and does not explain much. The subparts of the robot are described separately. It is difficult to find their functional connection.</p>	

Technical level	E - sufficient.
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
<p>The technical level of the submitted work is unbalanced. In the research part, the text looks technically promising. However, in the practical part, the technical level is represented only by a list of parameters from the parts documentation. The actual contribution of the student is minimal. Given the use of another project (AiRo) as inspiration, I would have expected a more rigorous description and presentation of student's own results.</p>	

Formal and language level, scope of thesis

C - good.

Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?

The submitted thesis is mediocly formatted. The text is not aligned in a block. The logo on the first page is of poor quality. The scanned assignment is difficult to read. Content should begin with an introduction. The introduction and conclusion should not be numbered. Page numbering should begin with the introduction. Image sources are not cited properly. Table 3 overlays the rest of the text.

English level is good. The thesis is organized in a logical way. The thesis is sufficiently extensive. However, most of the work presented consists of theoretical research.

Selection of sources, citation correctness

D - satisfactory.

Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?

The thesis cites the sources used. From this point of view, I have only a complaint about the citation of the images used, which are the majority in the thesis. The quality of the selected sources is rather below average. In most cases, these are only online sources that do not go through the peer review process. Not all bibliographic records meet the required standard.

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

I find the main weakness of the submitted work, which is reflected in all evaluated aspects of this form, to be the very low contribution of the student. The submitted work is essentially at the theoretical level and the actual implementation has hardly taken place.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.

Overall, the work presented in the thesis is unbalanced. After a promising research on the issue at hand, a relatively reasonable and justified choice of concept follows. Unfortunately, the actual solution in the form of design and implementation is developed at a low level. It is only a list of some components. A description of their synergistic connection is missing. The thesis completely lacks the main parts of documentation such as wiring diagram, program flow chart and the results of experimental verification of functionality. Together with the fact that the author was correctly inspired by a similar robot (AiRo), this raises the question of what the author's contribution is.

The grade that I award for the thesis is **E - sufficient**.

Questions:

- 1) How will the robot be controlled?
- 2) How will the robot be powered?
- 3) How was the H-bridge chosen for the selected motors?
- 4) Explain the basic control principle of the designed robot (e.g. using a simplified flowchart).
- 5) Middle part of the hemispherical wheel is not well designed. Explain, how do you guarantee the rigidity of the connecting shaft? How would you attach shafts to each other?

Date: **20.6.2022**

Signature: