THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Lidar Pose Calibration Using Coded Reflectance Targets**
Author's name:	**Matěj Novosad**
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis reviewer:	Ing. Vojtěch Cvrček
Reviewer's department:	Department of Cybernetics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment
ordinarily challenging

How demanding was the assigned project?

The assignment includes the integration of different sensors, and I consider it quite demanding. There are countless possibilities for technical roadblocks that could be very challenging and hard to debug.

Fulfillment of assignment
fulfilled with minor objecti

How well does the thesis fulfill 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.

Some parts of the assignment are not fulfilled. The primary goal, which is LIDAR pose calibration, was achieved. The integration with a camera is not pursued in this thesis.

Methodology
partially applicabl

Comment on the correctness of the approach and/or the solution methods.

The chosen solution is acceptable. I am missing some technical details that are necessary for implementation.
The student makes no attempt to make a quantitative comparison of his calibration with the current state-of-the-art methods. The thesis does not introduce any calibration error metric at all. Therefore, it is impossible for the reader to conclude the value of the work.

Technical level
D - satisfactor

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?

The key idea of using coded reflective targets is interesting, and as far as I can tell, it is innovative. The students proved the ability to understand and work with the LIDAR sensors. The explanation is sometimes unclear, but it is possible to follow the main ideas through the text.

The text claims that "We can clearly see that the walls align with minimal error," but the figures 3.6 and 3.7 that should demonstrate the "minimal error" are missing units. Such a claim should be drawn from a quantitative analysis of the calibration results. Some figures use decimal numbers for Laser IDs. The thesis shows a setup for the first target, but the setup for the second and more important target is never shown. The typesetting of algorithms does not distinguish functions, variables, and keywords. Algorithms are hard to read. The "Read Code" algorithm is incorrect (the second loop should use the variable *code*).

Many claims require citations or support from the data. The thesis makes enigmatic conclusions such as "Furthermore, the data set is too great to check each file manually. This is also the reason why we decided to go with dynamic programming in the first place, rather than AI."

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 thesis is organized in a standard way. The text could be longer, especially the experimental part and introduction. The English start at an excellent level, but it soon deteriorates. Some passages are missing technical details, or are grammatically broken, sometimes both. Hence, the comprehensibility of the text suffers.

Sections sometimes lack a proper introduction (such as the section "Removing possible misidentifications"). The text is sometimes missing/misusing articles or prepositions. I would advise the student to use some grammar checking tools in the future.

Selection of sources, citation correctness	E - sufficient.

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?

State-of-the-art is described and used inadequately. Some of the sources in the bibliography are never used in the text. The thesis contains claims that should be supported by proper citations. A serious shortcoming is the missing comparison with other calibration methods.

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.

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, I consider the thesis of lower quality. The main idea is promising and could potentially help the field. The description of the method is also acceptable. The weakest point of the thesis is the presentation of the results. Strikingly, the text lack any metric to evaluate the calibration method. Therefore, claims can not be supported by data and are of little to no value.

Technical weaknesses (such as figures lack units, presentation of algorithms) are the secondary problem. The author could improve the citation quality as well. The level of English is overall low and tends to complicate delivery.

In the future, the author will profit from a better examination of the state-of-the-art. It is easier to adopt a methodology from similarly oriented papers. It could also help to obtain some technical skills (how to present figures and algorithms). Careful study of previous papers simplifies establishing the work niche and contribution.

During the defense, I suggest that the student (1) explains why he did not use any metric to quantify his results, metrics are referenced in his sources (such as [10]), and (2) describes advantages of his method in comparison to the state-of-the-art methods.

The grade that I award for the thesis is D - satisfactor

Date: 23.8.2021

Signature: Vojtěch Cvrček