

I. IDENTIFICATION DATA

Thesis title:	Estimation of the Mutual Pose of Camera Stereo Pair Subject to Parasitic Dynamics
Author's name:	Tomáš Kratochvíl
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of cybernetics
Thesis supervisor:	Viktor Walter
Supervisor's department:	Department of cybernetics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
<p>The assignment required the student to familiarize himself with concepts, technologies and methods many of which have been completely new to him. This knowledge was then to be directly applied to a new, practical solution of a highly specific technical problem, which I consider to be challenging for a bachelor thesis.</p> <p>Notably, the student did not seem to have prior knowledge of many core concepts of 3D computer vision, which made him struggle at the beginning.</p>	

Fulfillment of assignment	fulfilled with minor objections
<i>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.</i>	
<p>The student made an overview of basic methods used for similar applications as that in the assignment. He then chose a set of methods to address the task of correcting the estimate of the changing relative pose of cameras in a stereo pair.</p> <p>These methods were also implemented in code compatible with our robotic system, although the implementation could use more work to be ready for practical deployment on real platforms.</p> <p>Due to rather slow pace of his progress, the optional extension of deploying the system on real hardware was not achieved.</p>	

Activity and independence when creating final thesis	C - good.
<i>Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared for the consultations. Assess the student's ability to work independently.</i>	
<p>The student had a relatively slow start on his thesis work, leading to a delay in the beginning which then propagated across the whole time of his work.</p> <p>Once his work took off, he consulted his progress on regular basis.</p> <p>The student did not seem to have prior skills in looking for and reading scientific sources and required extensive help with understanding underlying concepts of the task, as well as with technical writing.</p>	

Technical level	C - good.
<i>Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?</i>	
<p>The proposed solution is sound in the context of the task at hand.</p> <p>However, the written description does not fully explain the limitations the application in the assignment imposes. This could otherwise give the impression that more traditional methods of extrinsic calibration would be applicable. The limitations that could have been given more focus in the text are for example anonymity or partial ambiguity of the markers in relation to matching them between two images, the fact that the projective geometry of the lenses with a field</p>	

of view of more than 180 degrees precludes approximation with the linear pinhole camera model, the fact that the warpage the assignment is concerned with does not need to necessarily be constant during a single deployment or the fact that a desirable distribution and count of visible markers in the images can not be ensured in arbitrary flight during which the aforementioned dynamic warpage occurs.

Although an analytical solution, or a solution that is more optimal from various perspectives could have been developed, the proposed solution is a viable one and its random sampling approach can mitigate some of the issues arising from the considerations above.

Formal level 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 written form of the thesis has minor flaws, stemming primarily from the student's prior unfamiliarity with scientific writing as well as the aforementioned time issues.

The sections sometimes present ideas out of order, which could have been smoothed out with more revisions.

The page count of the thesis is somewhat low and could have been augmented for example by further elaboration on the specifics of the application as mentioned above.

Other formal aspects of the thesis are acceptable – it is written in decent English language and the figures are clear and complement the text well.

Selection of sources, citation correctness

C - good.

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 paper cites 15 references. These are relevant to the topic of the thesis, but more papers on specific methods and algorithms used for applications similar to individual sub-problems of the assignment could have been added.

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.

The task of correcting dynamically changing errors in the extrinsic parameters of a camera stereo-pair in parallel with actual deployment that uses these extrinsics in measurement lacks prior work, and thus the proposed solution does bring innovation.

Overall, the work done by the student shows promise for eventual practical deployment.

However, in all respects the text shows that more work could have been done, both in terms of exploration and discussion of additional methods as well as in implementation, practical testing and documentation.

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.

The grade that I award for the thesis is **C - good**.

Date: 7.6.20

Signature: