

## I. IDENTIFICATION DATA

<b>Thesis name:</b>	<b>3D Point Clouds Reconstruction of Environment Subject to Thin Structures</b>
<b>Author's name:</b>	<b>Matej Boxan</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Cybernetics
<b>Thesis supervisor:</b>	François Pomerleau
<b>Supervisor's department:</b>	Computer Science and Software Engineering

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>extraordinarily challenging</b>
<i>Evaluation of thesis difficulty of assignment.</i>	
The student started with a very open research question at the beginning of his internship (i.e., are subsampling algorithms have an impact on registration algorithm accuracy?), for which we didn't have a clear answer, even in the current scientific literature.	

<b>Satisfaction of assignment</b>	<b>fulfilled</b>
<i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	
All the elements of the assignment were fulfilled. The requirement of writing the report in the format of a conference paper was lifted because the thesis format required by CTU didn't allow the insertion of an article, which was an unknown limitation at the time of defining the assignment.	

<b>Activity and independence when creating final thesis</b>	<b>A - excellent.</b>
<i>Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.</i>	
The student was very prepared for all meetings we had. We were meeting when the student felt the need to have a formal meeting, which helped to assess his high level of independence. There was an informal meeting twice a week for quick questions. When let alone, the student was able to find his own motivation to push further different methods.	

<b>Technical level</b>	<b>A - excellent.</b>
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
The student used the existing literature as a starting point for his investigation. He developed his own metric for evaluation, integrated a robot for his experiments, tested multiple lidars and different environments.	

<b>Formal and language level, scope of thesis</b>	<b>A - excellent.</b>
<i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	
The thesis reads well. The equations are well formatted and proper Latex tools were used for a professional document.	

<b>Selection of sources, citation correctness</b>	<b>A - excellent.</b>
<i>Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.</i>	
The student used many references (i.e., 90) for his work. In the thesis, it is clear which sections relate to the work of others and which ones present his results. The student cited mostly peer-reviewed scientific papers. The bibliography of the thesis is complete and up to date.	

### Additional commentary and evaluation

*Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.*

A master's thesis, at least in my university, aims at introducing research to students. During a short six months of research, which included acclimating to a different working environment and dealing with a pandemic, Matej managed to navigate through the scientific literature to precise his research question. He also built his own experimental setup and found metrics to compare solutions. When facing unclear outcomes, he had to redefine his research hypothesis and he developed his perseverance through this normal research process. He could touch all steps of research and the outcome of his work will be used as a seeding point for a tier-one conference in the following month.

### III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

*Summarize thesis aspects that swayed your final evaluation.*

Matej started with a very open research question and had to navigate through many hypotheses on how to answer this imposed question. He was very rigorous during this process and his experimental protocol is beyond the state-of-the-art publications as I am not aware of mapping evaluation realized in degenerated environments (i.e., almost featureless tunnels) with ground truth. He managed to have qualitative results instead of the typical qualitative results (i.e., "this map looks better than this one"). The work realized is outstanding based on other master's thesis I evaluated.

I evaluate handed thesis with classification grade **A - excellent**.

Date: **25.8.2022**

Signature: