

I. IDENTIFICATION DATA

Thesis title:	Reconstructing 3D Models of Animals
Author's name:	legorova Valeriia
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis reviewer:	Karel Zimmermann
Reviewer's department:	Department of Cybernetics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	extraordinarily challenging
<i>How demanding was the assigned project?</i>	
The work required to understand complicated concepts of 3D geometry and deep learning and study many state-of-the-art. It was also necessary to refactor the existing pipelines of SMALST and WLDO for new CUDA and Python3 which was probably extremely time-consuming.	

Fulfilment of assignment	fulfilled
<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>	
Many state-of-the-art approaches has been properly studied and discussed in the thesis. Valerie have performed several experiments with both rigid 3D reconstruction method and model-based non-rigid methods. Also a novel SMAL4V pipeline has been proposed.	

Methodology	outstanding
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
Please insert your comments here.	

Technical level	A - excellent.
<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>	
Please insert your comments here.	

Formal and language level, scope of thesis	A - excellent.
<i>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?</i>	
Thesis is well written. I provide few minor comments mostly for author's considerations: Figure 5.7 is very helpful. The pipeline figure could also help with explaining differences among SMAL4V, SMALST and WLDO Page 6: I suggest to explicitly define if coordinates are homogeneous (e.g. x_i)? Do you really want to allow the rotation R to express also the mirroring (i.e. $\det(R)=-1$)? Page 12: Difference among l_{ij} , $l_j(x_i)$ and l_j in Fig2.9 in unclear.	

Selection of sources, citation correctness	A - excellent.
<i>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?</i>	
Valeria cites over 120 related works	

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.

Please insert your comments here.

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.

The work is above average. Valeria studied and cited over 120 state-of-the-art works and downloaded and completely refactored SMALST and GDGO pipelines for model-based reconstruction. Several different datasets have been also used for evaluation. Finally novel method SMAL4V has been implemented, however I am not sure if quantitative evaluation is available. The github (<https://github.com/iegorval/smal4v>) provides some visual demonstration of the SMAL4V results however it was not possible for me to find quantitative evaluation of SMAL4V in the thesis.

The grade that I award for the thesis is **A - excellent**.

Questions:

1. Quantitative evaluation of SMALST and WLDO pipelines under the various settings are presented in the experiment section, however I do not see any quantitative results of SMAL4V (at least with online learning). Are they missing or any of the presented results can be interpreted SMAL4V?
2. Would it be possible to use a 3D scene flow (e.g. [1]) as an addition source of (weak-)supervision? Or the other way around (can SMAL4V serve as the supervision for 3D scene flow)?

[1] Zan Gojcic, Or Litany, Andreas Wieser, Leonidas J. Guibas, Tolga Birdal: Weakly Supervised Learning of Rigid 3D Scene Flow. CVPR, 2021

https://openaccess.thecvf.com/content/CVPR2021/papers/Gojcic_Weakly_Supervised_Learning_of_Rigid_3D_Scene_Flow_CVPR_2021_paper.pdf

code: <https://github.com/zgojcic/Rigid3DSceneFlow>

Date: **13.1.2022**

Signature: