

I. IDENTIFIKAČNÍ ÚDAJE

Název práce:	Comparison of Methods for Matching of Images with Weakly Textured Areas
Jméno autora:	Ondřej Kafka
Typ práce:	bakalářská
Fakulta/ústav:	Fakulta elektrotechnická (FEL)
Katedra/ústav:	Katedra kybernetiky
Vedoucí práce:	Michal Polic
Pracoviště vedoucího práce:	Aplikovaná algebra a geometrie, CIIRC, CVUT

II. HODNOCENÍ JEDNOTLIVÝCH KRITÉRIÍ

Zadání	mimořádně náročné
<i>Hodnocení náročnosti zadání závěrečné práce.</i>	
The assignment of bachelor thesis focuses on enhancing three-dimensional reconstruction from images with weakly textured surfaces and illumination changes. The student should compare handcrafted methods for preprocessing of the input images and learned methods solving the relative pose problem. The student had to study Wallis filtering, Sparse-NCNet, and COLMAP reconstruction pipeline, implement and run related codes, compose testing datasets, chose methodology for evaluation, and compare these methods and their reasonable combinations.	

Splnění zadání	splněno
<i>Posuďte, zda předložená závěrečná práce splňuje zadání. V komentáři případně uveďte body zadání, které nebyly zcela splněny, nebo zda je práce oproti zadání rozšířena. Nebylo-li zadání zcela splněno, pokuste se posoudit závažnost, dopady a případně i příčiny jednotlivých nedostatků.</i>	
The student fulfilled all the points of the assignment. Moreover, he overcomes it by adding several other state-of-the-art methods in comparison, e.g., CLAHE filtering, CBM3D denoising, Magsac++, SuperGlue and SuperPoint. The work carefully compares all the reasonable combinations of listed methods and selection of its parameters for the selected challenging environment. The conclusions are important and have not been published yet.	

Aktivita a samostatnost při zpracování práce	A - výborně
<i>Posuďte, zda byl student během řešení aktivní, zda dodržoval dohodnuté termíny, jestli své řešení průběžně konzultoval a zda byl na konzultace dostatečně připraven. Posuďte schopnost studenta samostatně tvůrčí práce.</i>	
The student worked as expected during the whole semester. He was active and able to solve problems independently in high quality.	

Odborná úroveň	A - výborně
<i>Posuďte úroveň odbornosti závěrečné práce, využití znalostí získaných studiem a z odborné literatury, využití podkladů a dat získaných z praxe.</i>	
The level of the work is out of the scope of the bachelor thesis. It is on level of very good diploma thesis. The student was able to understand the state-of-the-art methods profoundly and apply the knowledge to different problems.	

Formální a jazyková úroveň, rozsah práce	A - výborně
<i>Posuďte správnost používání formálních zápisů obsažených v práci. Posuďte typografickou a jazykovou stránku.</i>	
The results are clearly described and well-illustrated in corresponding figures. The student wrote the thesis in good English without significant mistakes.	

Výběr zdrojů, korektnost citací

A - výborně

Vyjádřete se k aktivitě studenta při získávání a využívání studijních materiálů k řešení závěrečné práce. Charakterizujte výběr pramenů. Posuďte, zda student využil všechny relevantní zdroje. Ověřte, zda jsou všechny převzaté prvky řádně odlišeny od vlastních výsledků a úvah, zda nedošlo k porušení citační etiky a zda jsou bibliografické citace úplné a v souladu s citačními zvyklostmi a normami.

The citations are well selected and in a standard format used in scientific publications.

Další komentáře a hodnocení

Vyjádřete se k úrovni dosažených hlavních výsledků závěrečné práce, např. k úrovni teoretických výsledků, nebo k úrovni a funkčnosti technického nebo programového vytvořeného řešení, publikačním výstupům, experimentální zručnosti apod.

III. CELKOVÉ HODNOCENÍ A NÁVRH KLASIFIKACE

Shrňte aspekty závěrečné práce, které nejvíce ovlivnily Vaše celkové hodnocení.

The thesis assignment was challenging and fulfilled in all the points. Moreover, the student overcomes it significantly by adding several recently published state-of-the-art methods and their combinations in comparison. The thesis will be used as the background for scientific publication.

Předloženou závěrečnou práci hodnotím klasifikačním stupněm **A - výborně**.

Datum: 25.5.2021

Podpis:

I. IDENTIFICATION DATA

Thesis name:	Comparison of Methods for Matching of Images with Weakly Textured Areas
Author's name:	Ondřej Kafka
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Dept. of Cybernetics
Thesis reviewer:	Ondřej Chum
Reviewer's department:	Dept. of Cybernetics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment <i>Evaluation of thesis difficulty of assignment.</i>	challenging
Matching of images of containing low-textured regions or different illumination conditions is an active topic in computer vision community. Obtaining ground-truth dataset, arranging the experiments and final evaluation is a challenging topic for a bachelor thesis.	

Satisfaction of assignment <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>	fulfilled
The goals were fulfilled. Useful conclusions were drawn, the results can be useful in future work.	

Method of conception <i>Assess that student has chosen correct approach or solution methods.</i>	correct
The approach chosen by the student seems correct.	

Technical level <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>	A - excellent.
The results of the thesis seem to be technically correct and valuable for future work.	

Formal and language level, scope of thesis <i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	B - very good.
Most of the thesis is written in good English. However, a number of grammatical mistakes is present in the thesis. As a consequence, the manuscript is understandable, but not easy to read. It is a pity, spellchecking and / or proofreading would be a negligible effort compared to writing up the whole thesis in English. Examples. The abstract has two sentences, where the second does not have a verb. Sentences with a wrong word order, such as "Later in that chapter are introduced principles of SfM pipeline..." appear quite often throughout the thesis. Missing articles are a common problem to most of us.	

Selection of sources, citation correctness <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>	A - excellent.
There is an image matching benchmark https://github.com/ubc-vision/image-matching-benchmark with a corresponding publication Jin, Mishkin, Mishchuk, Matas, Fua, Yi & Tru: Image Matching Across Wide Baselines: From Paper to Practice. This work provides evaluation of various combinations of features, descriptors and matching strategies, submissions from public are evaluated too. This seems very relevant work that even originates from our department...	

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.

No additional comments.

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.

All the objectives were fulfilled and reasonable outcome was produced. The writing style requires some improvement. Overall, I believe the thesis still deserves the highest grade. I would like the student to relate the work in the thesis to the image-matching-benchmark project.

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

Date: **3.6.2021**

Signature: