I. IDENTIFICATION DATA

Thesis name:	**Manuscript Classification Using Convolutional Deep Learning Networks**
Author's name:	Zuzana Kožnarová
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis supervisor:	Vincent Christlein, Andreas Maier, Daniel Novák
Supervisor's department:	Friedrich-Alexander-Universität Erlangen-Nürnberg, Computer Science 5 - Pattern Recognition Lab

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment — ordinarily challenging

Evaluation of thesis difficulty of assignment.

The student had to evaluate the usefulness of pre-training for script type classification and to investigate other methods to improve recognition performance. Both tasks were feasible in the time for a Bachelor's thesis and had the normal difficulty level

Satisfaction of assignment — fulfilled

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.

The student did a very good job and fullfilled both mentioned tasks.

Activity and independence when creating final thesis — A - excellent.

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.

The student worked very independently and found out essential solutions on her own.

Technical level — B - very good.

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

The technical level was very good, maybe the deep learning book by Goodfellow et al. could have helped to clarify some things.

Formal and language level, scope of thesis — B - very good.

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

The formal notation was excellent, I haven't found any error in this regard. Language-wise there are several mistakes but not serious ones.

Selection of sources, citation correctness — B - very good.

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.

There are no serious errors, however, when citing a book it is common to also mention the page. This was missing for reference [16] . Also reference [20] lacks some details (currently available as report on arxiv.org).

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.

The student made a great effort in improving the classification results of script types and brought up the importance of proper whitening to my attention. The student did also a very good job in reprocability of the code. Regarding fine-tuning there are still several open questions, esp. Section 4.3 needs some more clarification (see below). However, for a Bachelor's thesis, the student fullfilled every task and showed a great enthusiasm to the topic.

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Some (minor) open questions:

- In Section 4.3 it is not very clearly written how the datasets are spolot up. It is also questionable why only 8 areas are chosen. Then, for each area 3 random patches are taken resulting in 24 areas. Why not using one large area where 30 random patches are chosen?

- It is also not clear if the icdar17 dataset was augmented or not when training for it.

- Which validation sets have been used for table 4.2?

- Table 4.3: Which layers were fixed? The first ones?

Overall, I am very happy with this Bachelor's thesis. The student came up with own ideas such as whitening which I might have overseen. With this rather simple preprocessing step, she improved the state of the art in script type classification by 6% which is quite a lot in this field.

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

Date: | 08/14/17

Signature: